SEPTEMBER 1958

Skyways

FOR BUSINESS

The official publication of the National Business Aircraft Association

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SUPPLIERS' PROGRESS REPORT

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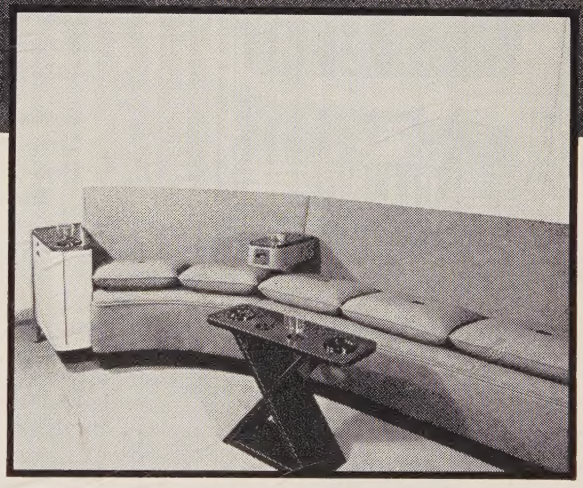

Luxurious and functional in every detail, the new custom lounge of the Boeing 707 (large picture) and the Douglas DC-7C (smaller picture) are two of the many types created by AiResearch Aviation Service to meet individual requirements of the world's leading airlines.

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SEPTEMBER, 1958

Skyways FOR BUSINESS

The official publication of the National Business Aircraft Association

COVER: This issue salutes industry's wings, covering the length and breadth of our land and spreading to the four corners of the world, are fully dependent on the many suppliers catering to the requirements of those wings—aircraft, powerplants, equipment, fuels, oils.

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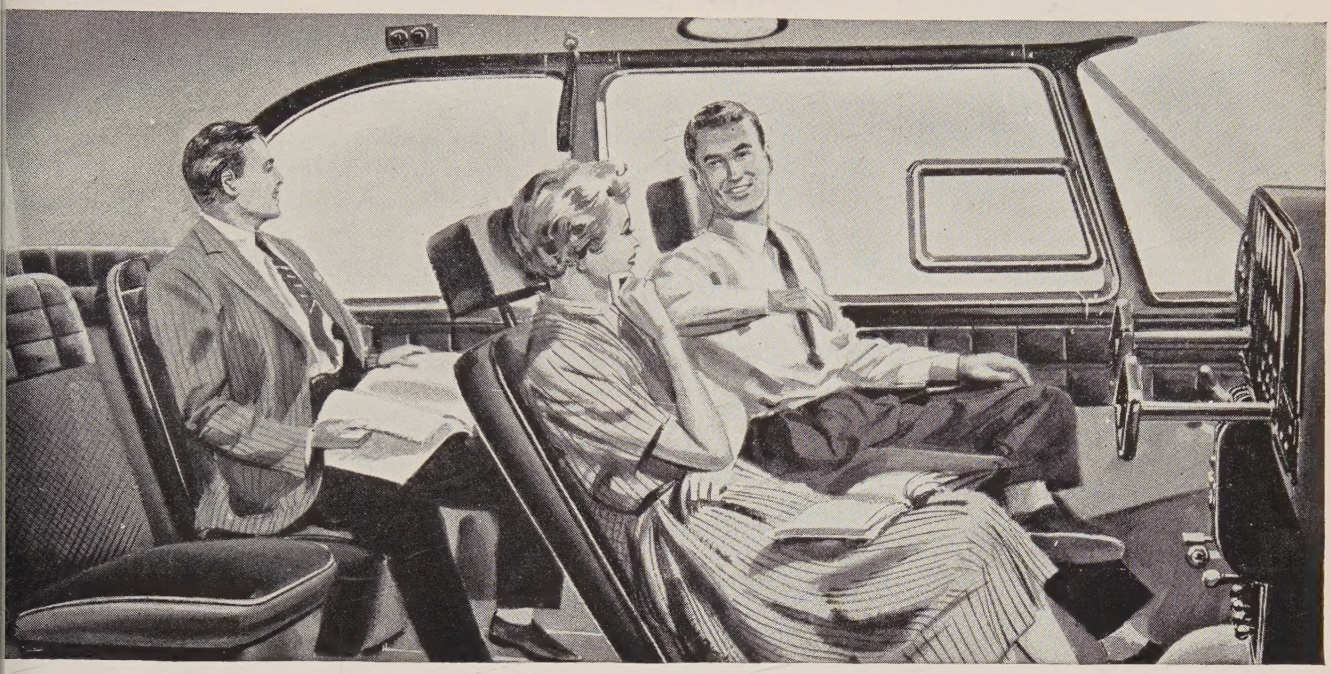

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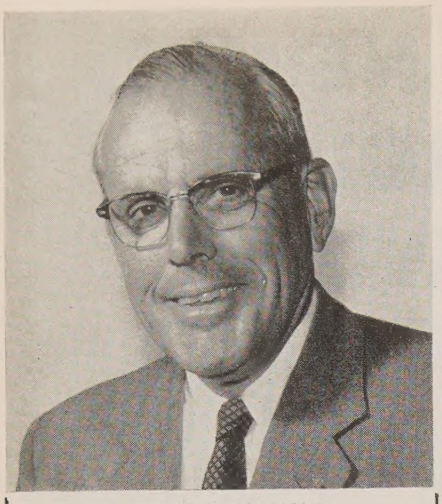

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Aviation Roundup

REFUTING CAB CHARGE OF CAA NEGLIGENCE IN LAS VEGAS COLLISION, Administrator Pyle points out that Board's own regulations deprive CAA of authority to resolve airspace conflictions, compel reliance on *voluntary concessions* by military et al. Paradox—FAA legislation aimed at curing whole airspace problem eliminates this healthy agency cross-check!

★ ★ ★

VFR WEATHER MINIMUMS UPHELD BY CAB RULING . . . in unexpected but clear-sighted pronouncement abruptly terminating the attempt to curtail free and unrestricted use of nation's airspace by any group of users with special problem. Rejecting the proposal to increase visibility minimums of VFR flight, CAB pointed out that overwhelming weight of evidence was that current values of VFR minimums had no bearing on 98% of all mid-air collisions in past 10 years and called for increased study of all other methods of reducing this hazard, including amendment to C.A.R. *to relate visibility minimums to the air speed of the aircraft.* Except for re-titling 60.30 to 60.31 to add words "Basic" and "Special" to "VFR minimum weather conditions . . . ," the only change is to drop the provision for one-half mile visibility in a control zone where restriction to visibility was due to local surface condition as smoke, dust, etc.

★ ★ ★

UNITED AIR LINES, GIVING THREE-WAY ASSIST TO BUSINESS FLYING, going on record for truism that "what's good for business aviation is good for us." UAL, have already extended services of their Flight Training Department to both personal and professional business pilots, now announces that, within limitations of their control, gate space at any of their stations is available to connecting business aircraft. Additionally, United's extensive Thunderstorm Grid Message (TGM) Service covering their routes is available to NBAA members via ARINC. (Air-to-ground contacts with ARINC are subject to user charges.)

★ ★ ★

EUPHORIAN AIRCRAFT SEATS, manufactured and marketed by North American Aviation (NBAA member) subsidiary, Navan Products, Inc. H. O. Bales, Navan gen'l mgr, states program result of arrangement with Universal Equipment Co., licensed in aircraft application of the Euphorian body rest curve by patent owners, Ritter Corp. Navan exclusive world-wide agency. Executive aircraft applications already planned.

★ ★ ★

FLYING PHYSICIANS ASSOCIATION members may obtain special number for their aircraft to include MD instead of another letter.

★ ★ ★

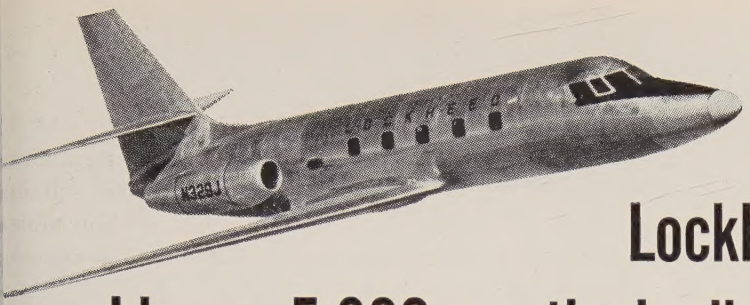
NEW CESSNA MODEL 210 planned for late 1959. Designed as a Cessna entry in the high performance single-engine market between the Skylane and 310B, it has "advanced design features." Del Roskam, vice-president and general manager, Cessna commercial aircraft division, points out the new Model 210 "incorporates new design features not previously used on a commercial single-engine airplane." Prototype has been flown for "some time."

★ ★ ★

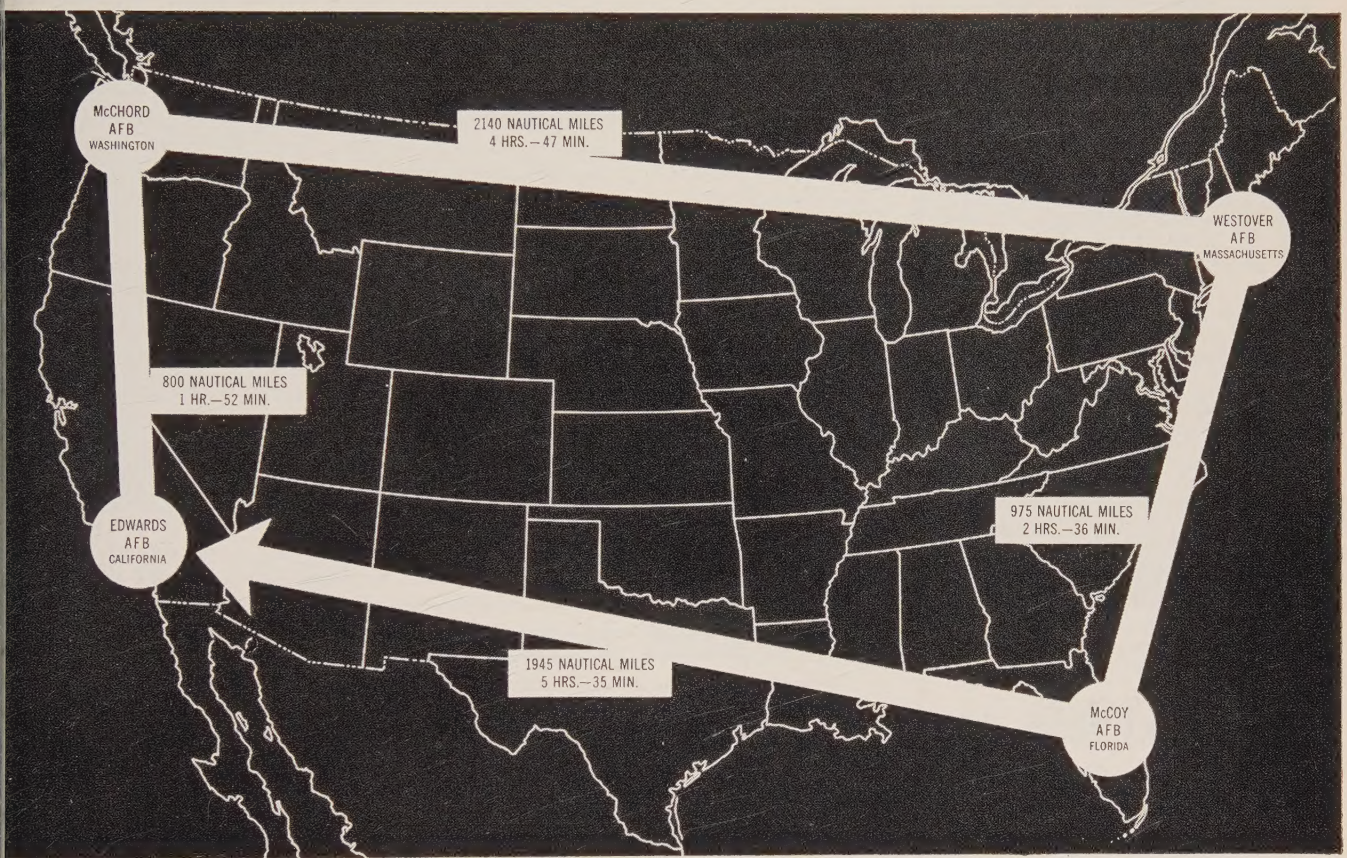
BEECHCRAFT MS-760 CERTIFICATED by CAA. The first twin-jet business plane to receive a CAA Type Certificate. The four-place MS-760 will be offered by Beech in the United States, Canada, and Mexico under license by the French manufacturer, Morane-Saulnier Co. of Paris.

★ ★ ★

NAPIER-POWERED CANADAIR 540 is due to roll out next July. The DoT (Canadian CAA) certification trials were completed with flying colors using the Napier Convair 340 now touring the states. Based on the 440 jigs and tools, the entirely new airplane will have greater capacity and speed.



Lockheed JetStar blazes 5,860 nautical-mile jet trail around U. S. A.—in 14 hours, 50 minutes!


McCHORD AFB WASHINGTON
2140 NAUTICAL MILES 4 HRS.—47 MIN.
WESTOVER AFB MASSACHUSETTS
800 NAUTICAL MILES 1 HR.—52 MIN.
EDWARDS AFB CALIFORNIA
975 NAUTICAL MILES 2 HRS.—36 MIN.
1945 NAUTICAL MILES 5 HRS.—35 MIN.
McCOY AFB FLORIDA

The Lockheed *JetStar*—an economy-size utility jet trainer/transport of sweptwing design—dramatically demonstrated its high altitude, long-range training mission capability by making a four-corners-of-America flight—in 14 hours, 50 minutes flying time (17 hours, 50 minutes elapsed time).

No special flight equipment was needed by the crew and passengers aboard the record-setting *JetStar*. They flew in fully pressurized, air-conditioned comfort, at altitudes up to 46,000 feet, at speeds up to 596 knots. Due to the aft fuselage mounting of engine jet pods the *JetStar's* cabin was so quiet everyone could talk in normal conversational tones at all times and be clearly understood.

The *JetStar* was equipped for this flight with 640-gallon "glove" tanks—giving it a range capability of over 2600 nautical miles. The production model *JetStar* will offer choice of either two or four engines, configured to use General Electric J-85, Fairchild J-83, Pratt & Whitney JT-12, or Curtiss-Wright TJ-37 power plants.

Military missions for which the *JetStar* was designed include: navigator-bombardier trainer, airways and air communications inspection, fighter-intercept trainer, high-priority personnel/cargo transport and several other critical missions.

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Editorial

SUPPLIERS TO THE FLEET

Industrial America is no longer bound to waterways, to railways and to highways Industry has wings and, as a consequence, it has a new mobility, a new dimension which assures an upward curve of efficiency.

No longer bound to the snail's pace of surface transportation, American industry now spends minutes in physically communicating with its tools, its equipment and its men over distances that once took hours. It communicates over land and water areas in hours that once took days, if not weeks and months.

This is a new power, a new sinew and a new muscle. Industry's new winged tool helps to create and to supply steadily the abundance of necessities and comforts now so uniformly available to all of us.

The industrial wings that cover the length and breadth of our land and spread to the four corners of the earth have dependency upon those who supply the myriad requirements of those wings. From airframes and power plants and accessories and electronics and instruments down to nuts and bolts, the supply lines for industry's wings are open. Fixed base operators, overhaul shops and repair stations are part of the armada of business aircraft fleet suppliers. All of these, and more, are marching hand in hand with steel and oil and coal and utilities, with agriculture and scores of others in building a better America—a better world—where the fruits of our labors may, in peace, be shared by all mankind.

WELCOME TO THE SOCIETY

A recent statement made by the Vice-President for Operations and Engineering of the Air Transport Association would indicate that ATA, with the balance of power in its hands, was on the wrong side of the fence in 1956 when it backed the military in killing civil DME and making that portion of Tacan a part of the common system.

ATA now backs a future requirement for DME facility, but not necessarily Tacan's, estimating that the cost is more than six times that of an original civil DME.

During the VOR/TAC controversy, it was apparent to all general aviation, and should have been to ATA, that civil DME met all common system requirements at a cost far below Tacan's and without a four or five year interruption of service.

ATA is welcome in the Society of Civil DME Advocates. It is regrettable that it did not join when its vote might have spelled the difference between the loss of civil DME and an increase in the taxpayers' bill of more than $400 million.

Maybe the day is not far distant when the military will also join the Society. The test will come early next spring when NATO countries are expected to reject Tacan. Certainly, ATA's recent "about face" will strengthen the NATO countries known stand against it. The military should somehow find a graceful way to abandon this electronic White Elephant of modern aviation.

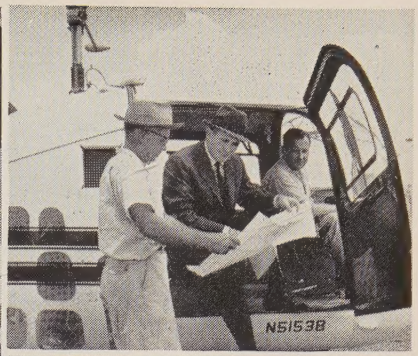
FAA

General aviation has gone all out in unaminous support of the recently passed Senate Bill 3880. This legislation is designed to create an independent Federal Aviation Agency.

A consolidation of the Federal management for all of aviation within a single authority is a long sought goal of all segments of civil aviation. Freely acting without being hamstrung by an Executive Department such as Commerce, aviation will be in a position to keep current with the requirements arising from this fast moving jet-space age. The snail's pace control of some 60 agencies, bodies, administrations, groups, committees, panels, sub-committees and ad hoc groups has been a drag and impediment on aviation progress.

In the contagion that is understandable in this good chance to "unhalter" aviation, some precautions have been overlooked, not the least of which is a single body that can be lawmaker, enforcement policeman, judge and executioner. The right to appeal from FAA's decisions is not included in the Senate version. There should be a check and balance against the possibility of capricious, arbitrary or precipitous rule making by the Agency. Everyone wants an FAA—but a democratic American FAA where the lawmaker is not also the judge and executioner!

Henry W. Bogges



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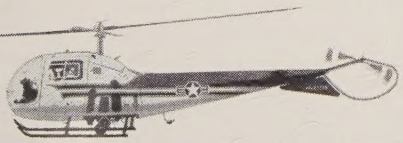
See the new '59 Bell Ranger at the NBAA show in Philadelphia September 22-26.



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Veteran test pilot Fisher gets 707 flight test checkout from long-time friend Tex Johnston, Boeing Chief of Flight Test.

Noted test pilot gives a behind-scenes operational report on America's first jet airliner . . . another in Champion Spark Plug Company's series on aviation history in the making

FLIGHT TEST, 707!

by HERB FISHE
International aviation authority, veteran test pilot, autha

The 707 seats 112 to 180 passengers. New York to London, 6½ hours! Pan American starts first jet service to Europe this Fall.

That "greatest-yet" moment in American aviation history—dawn of the commercial jet age—stands at zero hour. Pan American has just taken delivery on the first of 23 Boeing 707 turbojets. Other airlines will put Douglas, Convair and Boeing turbojets in service in the months to come. It's been a long count-down . . .

The 707, designed to cut existing passenger schedules in half, was first flight tested on July 15, 1954. A transcontinental speed record was almost automatic—Seattle to Baltimore, 3 hours, 48 minutes; cruising speed, 612 mph.

As a test pilot who's flown about every type of transport including the 707, I'll say right now it's impossible to describe the performance difference between the 707 and conventional aircraft. The 707 i pilot's dream as well as a passenger's. easy to fly. Its performance is superb

You flick a switch. Champion jet ig ers fire three- to four-inch bursts into combustion chambers every second fo seconds. The 112- to 180-passenger craft comes alive instantly. No warm necessary. Flight test is on.

Releasing brakes for takeoff, you rea in an odd moment of pride-spiked hu ity that your finger tips command million of precision-built aircraft— 60,000 pounds of thrust that's going ram skyward *a mass nearly twice weight of today's big propeller airlin* The 125-ton ship breaks ground at knots. You feel a surge as retracting la

gear and flaps reduce drag. Soon
e at 300 knots indicated. Your rate-
imb is more than double that of
nt-day aircraft.
limbed to 35,000 feet in 13 minutes.
uising at 600 mph between 30,000 and
0 feet—well above weather and
e jets perform best—you sit back,
, look around. Absence of piston-
ne throb delights you.
e's practically no vibra-
You hear turbines
e but faintly. Aft, pas-
ers will hear only a faint
tling, will not be buffet-
y ordinary turbulence.
ou check your 20 engine
uments again. It's quick
easy: All needles are
llel during normal oper-
n. All the pilot need do
atch for a needle off
llel!
lots, the simplicity and
sty of jet control is like
yer answered. Gone are
synchronizer, super-
ger, cowl-flap, mixture,
uretor-heat and prop-
h controls and mag
ches. Primary flight con-
are 100 per cent manu-
operated. No power-
st. Spring tabs cable-
nected to wheel and rud-
pedals actuate controls.
rnal pressure balances
ide low control forces
ow-speed maneuverability and higher
es for high speeds where abrupt maneu-
aren't desired. End result—"natural"
No sluggishness, no over-sensitivity.
id-span, high-speed ailerons supple-
ted by hydraulic spoilers and (when
s are down) use of outboard, low-
d ailerons simplify lateral control.
s permits safe operation from airports
a 90° crosswind of 30 mph, and the
lers provide speed brakes for a wider
ice of approach angles.
ower control is simple as a broom
dle. A single lever mechanically con-
ed to a hydro-mechanical regulator on
engine slows and speeds the plane.

Fuel-air ratios take care of themselves.

For dual reliability, each engine has normal tank fuel flow plus two independent electric boosters. Engine-driven pumps feed fuel if the electric pumps are lost. In emergency, a manifold line may draw fuel from any tank. Likewise, the 707 has two independent hydraulic systems for actuation of spoilers, flaps, landing gear, nose-gear steering and brakes.

Even over air-turbulent Mt. Rainier, 707 passengers will experience but slight, springy motion.

You put the 707 through her paces. Then—the crucial moment: *You simulate flameout*, though chances of it happening are slim. Engine is dead. And the life-trigger—the jet igniter—has been in this jet furnace *enduring temperatures of thousands of degrees for hundreds of accumulative flight-test hours . . .*

Flameout. You take comfort in the knowledge that Champion's long history of spark plug development includes *unique* know-how with jet igniters dating back to the birth of experimental jet engines—those built by General Electric in wartime 1943! And that Champion was first with jet igniters in military aircraft—and has held that lead since . . .

You flick the switch. Two jet igniters spit lightning into the dead turbine. The big Pratt & Whitney engine flashes to life.

Flight test secure, you descend comfortably at 10,000 feet a minute. With speed brakes, single-motion power control and provision for lowering wheels at cruising speed, slow-down distance is but *two miles*. Go-around safety is assured. The big ship maneuvers easily in the traffic pattern.

The 707 goes into service as the most thoroughly tested airliner in history, Tex Johnston, one of the great test pilots, tells me. It's backed by 24,000 hours of wind tunnel testing, 1,500 hours of flight testing—plus the performance record of its military counterparts.

Likewise has the reliability of the vital Champion jet igniter been established—15 years of testing and performance in military aircraft operating under grueling conditions, four years in exhaustive 707 flight testing. Champion's depth of experience and demonstrated ability to make metal and ceramic parts capable of perfect functioning in fantastic temperature ranges led Pratt & Whitney to Champion when the J-57 engine was being developed. A jet igniter must not only be capable of re-igniting the turbine at critical altitudes and speeds, it must deliver instant starts on takeoff day after day.

Today Champion is teamed with engine manufacturers in advanced jet engine development and remains the greatest volume producer of jet igniters in the industry—hence the superior igniters at much lower competitive costs.

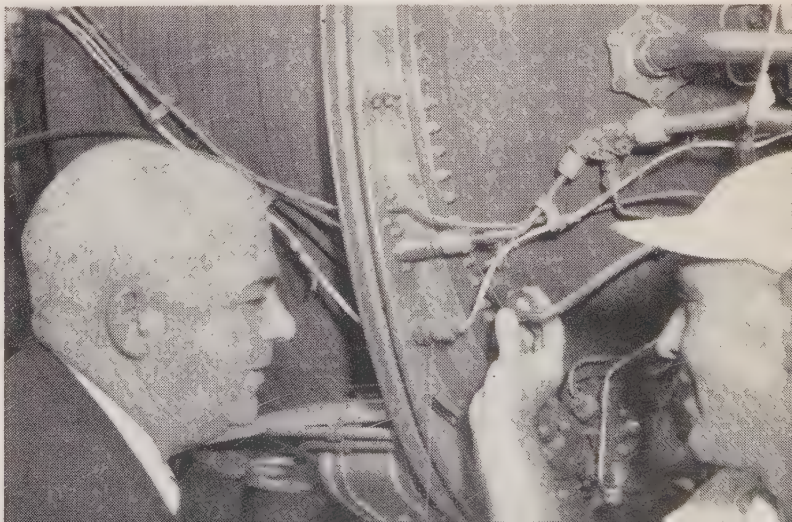
Tomorrow . . . well, this is *it* for Pan Am, American Airlines—and the 707!

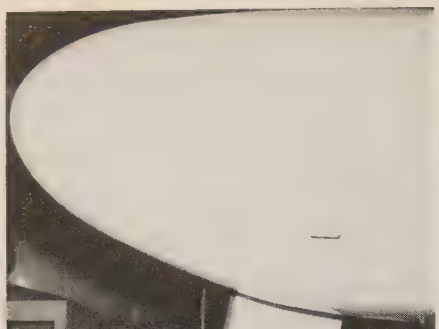
Champion Spark Plug Co. • Toledo 1, Ohio

. . . *salutes the Boeing Airplane Company*

ames in assembly at Seattle. Boeing takes extra
with 707 airframe structural safety and endurance.

Fisher and Rudolph Blazek, Experimental Pre-flight Foreman, inspect Champion jet igniter in 707 turbine.





THE SHAPE
of THINGS TO COME..

There are
BIG GOINGS-ON
here at LBS —
Startling developments
are taking form!

Don't miss the
SURPRIZE OF THE CENTURY
at the 1958 NBAA
meeting!

* * * * *

Always the Leader,
naturally

"for all your aviation needs"

L.B.Smith
AIRCRAFT CORPORATION
International Airport • Miami, Fla.
Circle No. 31 on Reader Service Card

NBAA DIRECTOR'S NOTES

NBAA is urging the CAA to set up a program whereby a greater and more wide-spread dissemination of information can be made regarding radical and short-notice changes in restricted areas, special air traffic regulations, and other pertinent pilot information.

Portland International Airport Military Climb Out Procedures which sets up new type of restricted area for Century series fighters—to permit safe scramble procedures—originally gave an August 1st date of implementation.

Some civilian users (Airman's Guide subscribers—10,000) would have had the notice in their hands by July 29th—two day notice. Others (8,000) who subscribe to Coast and Geodetic Survey Radio Facilities service would have received their notification about August 1st. Jeppesen subscribers (about 25,000) would have received their notice, despite special handling efforts, about August 1st.

With more than 650,000 pilots to be notified, it appears obvious that the current methods of information distribution need radical overhauling. One suggestion NBAA has made. Have each airport and every fixed base operator at each airport placed on CAA mailing list for these special types of notices. A CAA Information Board at each airport and each fixed base operator's shop would enable every pilot using those facilities to get the urgent information.

The pilot who doesn't have the WORD—is the pilot who can unwittingly be subjected to violation-filing or, worse yet, unintentionally expose himself and others to collision hazards.

One of the regular questions about NBAA's Annual Meetings comes up at this time of the year—do we have to be NBAA members to attend the meetings and forums?

Every business pilot, maintenance man, owner and supplier is invited to attend. All that NBAA asks is that you register, assume the registration fee which also covers all lunches, banquets, social hours and enjoy yourself.

The purpose of these meetings is to discuss pertinent problems which face all who are in business aviation. Aircraft engine and accessory maintenance, air traffic control, weather bureau expansion plans, aircraft cost analysis—are some of the prime topics on the agenda this year.

Philadelphia, Pa.—September 22-23-24—Bellevue Stratford Hotel: paste these dates and places in your memory box. This is *your* invitation.

NBAA's Recommended Standards Manual—the first comprehensive collection of guide lines to business aircraft operational policies ever to be published—is now in the hands of all NBAA members.

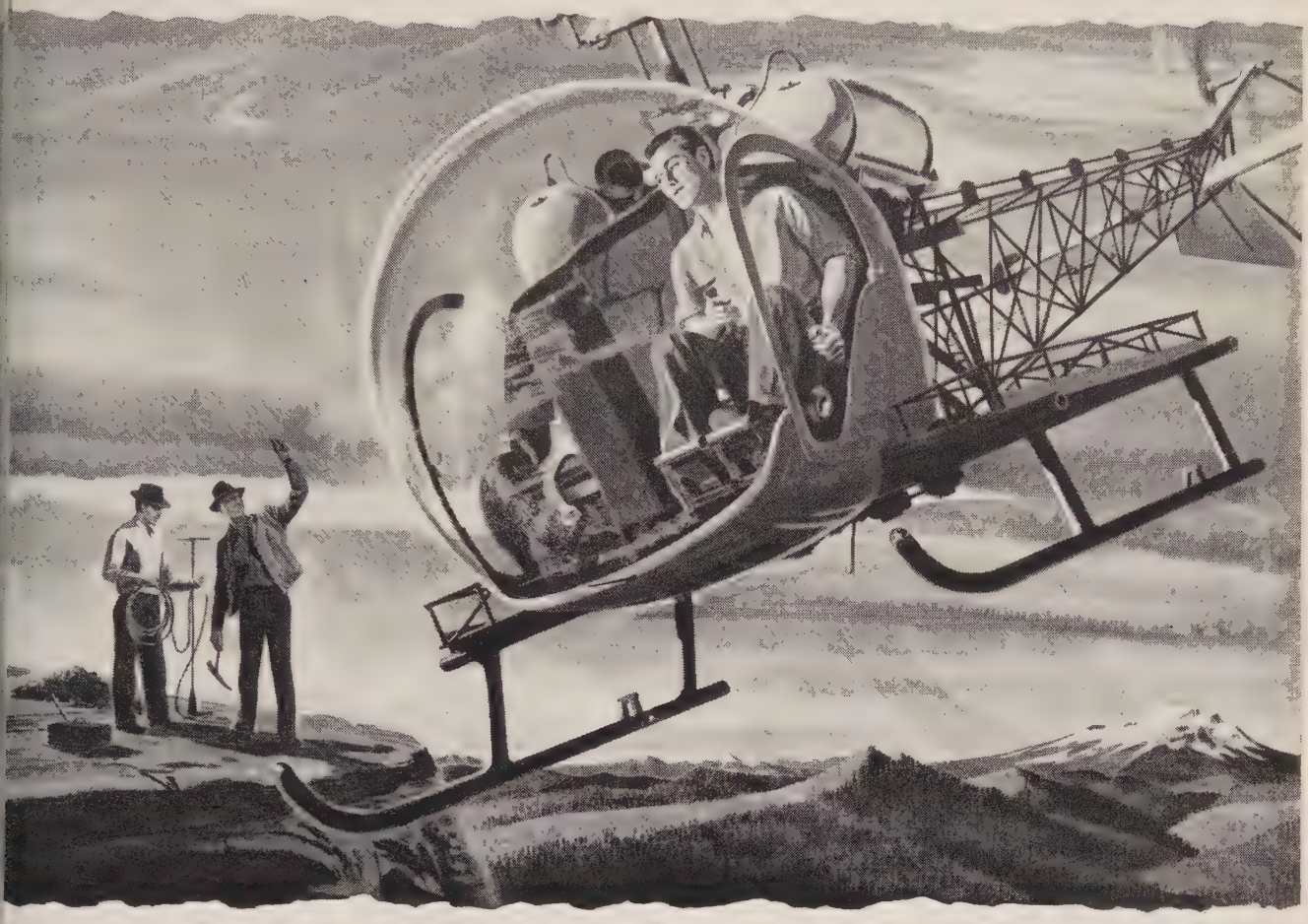
Covering Management, Operations and Maintenance—the Manual contains recommended practices and procedures for the administration of a business aircraft operation. Designed for study by top management of companies with an aviation department as well as for those within the aviation department of a company—the manual offers a series of check lists which may be applied to any type of business aircraft operation.

The NBAA Manual was authored by Harley D. Kysor, Presisdent of Aeronautical Consultants and Associates, Inc. of New York, with the advice of and in consultation with NBAA members, governmental aviation agencies, and other qualified sources.

The NBAA Manual is available, on request, to all business aircraft owners and operators, libraries, research consultants, and others who are interested. Contact NBAA headquarters for price information. *(Continued on page 79)*

PLANE FAX

by STANDARD OIL COMPANY OF CALIFORNIA



lying the Yukon air trails for "black gold"!

ıe Alaskan Yukon country is one of the world's roughest ots to search for oil . . . even by air. Helicopter pilot ıdd Darling, of Skyways Inc., Portland, Oregon, special- es in flying geologists and oil survey parties into remote ıd unusual areas, inaccessible to other types of aircraft. ɔ allow examination of outcroppings or collection of ore mples, he frequently touches down on mountain ridges st wide enough to take the skids of his helicopter, a ell 47G2, with a 260 h.p. Lycoming engine.

"Maneuvering through difficult areas requires instant engine response at all times, including frequent use of full emergency power," says Budd Darling. "We can't take chances on spark plug fouling or rough running. That's why we use Chevron Aviation Gasoline and RPM Aviation Oil Compounded." Skyways Inc., uses Chevron and RPM Aviation Products exclusively for their home-based operations at Portland's Troutdale Airport as well as their Alaskan flights.

TIP OF THE MONTH

On night landing approaches, keep clear of all towers! Many of them have diagonal supports to the ground and while towers carry warning lights, supports are sometimes hard to see.

We take better care of your plane

CHEVRON AVIATION GASOLINE

AVIATION OILS RPM

T.M.'s "RPM," "Chevron," "Chevron Design," "Plane Fax," Reg. U.S. Pat. Off.

Circle No. 36 on Reader Service Card

Suite 344

N Three Zero Four Zero Papa lifted at 8 A.M. EDT, destination, Louisville (12 Noon) and Joplin, Mo., (3:24 P.M.) with Joe Lacey as ChP, H. W. Boggess as CoP and Yours Truly. Yep, you guessed it—I am a stubborn Missourian. It was the most enjoyable X-Country trip I have ever made by air. Six hours and 34 min. from Wash. to Joplin by a business plane, saved me at least three hours.

If owning and operating a business aircraft that can take off when busy executives are ready, and go where those busy executives and personnel have to be, is a luxury, and the American Public are "spoiled brats" then I, like everyone else, and let's not kid ourselves, like to be "spoiled brats."

By this time all NBAA Reps. have received NBAA's Recommended Standards Manual. A panel discussion outlining the Manual's objectives, format, material and plans to keep it up-to-date will be held at the Annual Meeting.

WHO WILL BE "MISS BUSINESS AVIATION, 1958?"

The Phila. Local Arrangements Committee is prepared for all of you, Sept. 22, 23, 24.

Consult your tentative program. Make your reservations NOW.

Info booths will be set up at the Terminal Bldg. and at Atlantic Aviation. Coordination between all manned booths in regard to transportation to and from the hotel, etc., will show at all booths. Helicopter shuttle service will be made available by Bell with three helicopters operating between Atlantic Aviation and a site on the Parkway. Bus and autos will be available at the airport and Parkway for those attending NBAA's Meeting.

GUESS WHO WILL WIN No. 4 WAA (Women's Aeronautical Association of Kansas) trophy?

Martha Hart, North America Co's., has different activities for the women who care to participate. Of course, girls, you don't want to miss our many interesting lunches, banquets, aircraft displays, and above all, don't miss the "Pennsylvania Dutch Night."

All NBAA MEMBERS and NON MEMBERS ARE WELCOME.

WELCOME TO NBAA MEMBERSHIP: (Regular) ALBRITTON ENGINEERING CORP., Bryan, Texas. Mfgrs. of aluminum windows and window walls.
Operated aircraft since 1957. Now operating a Cessna 310.
NBAA Rep.: Ford D. Albritton, Jr., Pres.
Chief Pilot: Warren C. Harmon.

THE NATIONAL CASH REGISTER CO., Dayton, Ohio, Mfgrs. of business machines and cash registers. Operated aircraft since 1954 and now operating two DC-3s.
NBAA Rep.: Donald T. Keeley, Chief Pilot.

THE SECURITY ELEVATOR CO., Hutchinson, Kansas. Mfgrs. of terminal and country elevators for grain handling. Operated aircraft since 1946. Now operating a Cessna 310.
NBAA Rep.: Chas. W. Summers, Pres., and Chief Pilot.

TRAYLOR BROS. INC., Evansville, Ind., General Contractors. Operated aircraft since 1947. Now operating Beech Bonanza.
NBAA Rep.: Charles M. Hayes, Chief Pilot.

(ASSOCIATE) — FORT WAYNE AIR SERVICE, INC., Ft. Wayne, Ind. Sales, repair and rental of aircraft. Operated aircraft since 1957. Now operating Aero Commander, Cessna 310, Cessna 140, Tri Pacer and Ercoupe. (NBAA's only Ercoupe).
NBAA Rep.: C. P. McClanahan, Gen. Mgr.

HAYES AIRCRAFT CORP., Birmingham, Ala. Research, development, design, support and mfgrs. of aircraft and missiles. Operated aircraft since 1951. Now operating Aero Commander 680.
NBAA Rep.: E. D. Gerhardt, Dir. of Sales. Executive Pilot: Clem Honkamp.

See you in Phila.

"C. M."

RELIABLE
RADIO REPAIR AND
OVERHAUL IS OUR JOB . . . EXPERIENCE IS OUR TOOL
FLORIDA AIRCRAFT RADIO & MARINE, INC. IS YOUR ASSURANCE!
ARM
• LARGE STOCKS OF NEW AND SURPLUS EQUIPMENT
• CAA APPROVED REPAIR STATION #3653, CLASS 1 & 2, Limited Class 3
• COMPLETE STOCK OF REPLACEMENT PARTS AND SPARES
• STATE DEPARTMENT EXPORT-IMPORT LICENCE #3108
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is our symbol to you of PROVED dependability in meeting your aircraft radio needs. Under one roof and across from the airport ARM keeps a complete inventory of parts and equipment . . . PLUS a completely trained and licenced crew of specialists.
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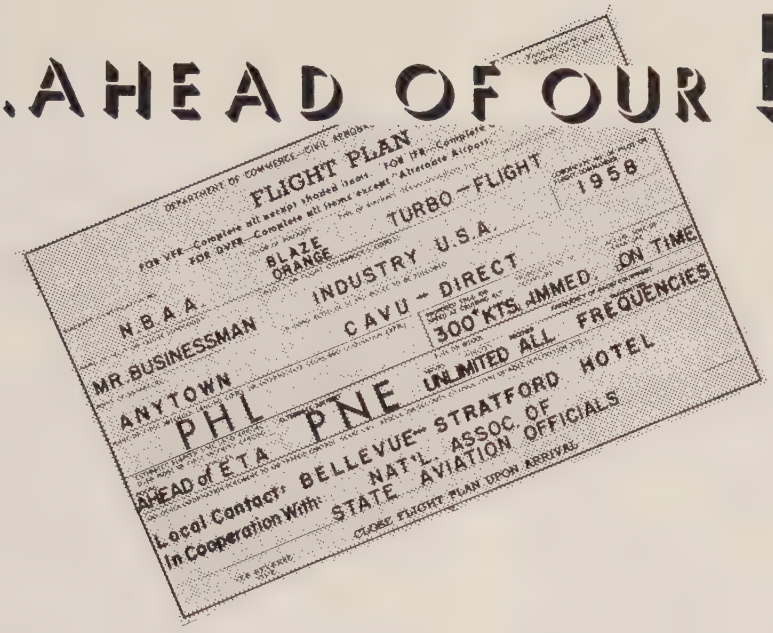
Phone TUxedo 8-4614
WM. C. ROGERS
PRESIDENT

"....AHEAD OF OUR ETA!"



In the never ending race of our expanding national economy, business aviation continues to shatter all previous records. Coming at the three-quarter mark of the year, the NBAA 11th Annual Meeting and Forum at Philadelphia this month becomes a "fix" point at which to check our progress. Business flying has done well. Again we are far ahead of our ETA (Expected time of arrival)! A check of our "ground speed" reveals:

- Over 30,000 aircraft are being operated by American industry—flying well over 5 million hours a year.
- Almost a billion dollars spent for new aircraft, modifications, gas, oil, maintenance, parts in 1957.
- Business aircraft shipped in 1957 overseas—$15 million.
- Aircraft industry profits booming.
- Business aviation accessories and instrument purchases are bigger in a single year than similar purchases by the commercial airlines in several years.

Above all, what can't be measured is what business flying has done to give the corporate executive and key personnel more efficient use of that most precious commodity—time.

As Cessna's Dwane Wallace put it:

"Through the use of the airplane, executive and sales personnel are becoming more productive."

Or Aero Commander's George Pew:

"We can *buy* time. Company planes *provide* time."

". . . increasing frustrations of ground transportation will add impetus to business use . . ." says Harvey Gaylord of Bell Helicopters.

Bill Piper: ". . . the high salaries make it uneconomical to use slower transportation."

Sept. 22, 23 and 24 in Philadelphia, America will see the power which business aviation represents today and what it means for tomorrow. During these three days, everything there is to see, and know, will be there in exhibits, discussions, speeches and face-to-face contacts.

As a preview, Skyways has gathered the latest available information of developments concerning business flying—assembled in this issue. As you turn the pages you'll see a business aircraft panorama—section by section—airplanes and helicopters, powerplants, electronics, and other equipment, conversion and modification centers—and the latest operational news.

In our Convention issue (October), we will feature brief articles by the presidents of the aircraft companies supplying the market, discussing the today and tomorrow of business flying. (Also, look for short, fast-reading comments by top industry executives on their use of aircraft for business.)

We at Skyways think it's going to be a glorious tomorrow. *Time* magazine's April 28 issue affirms this outlook in pointing out that the business plane boom ". . . will lift industry to peak profits this year. Cessna Aircraft enjoyed most prosperous period in 31-year history, saw after-tax earnings jump 86% over a year ago to $1,586,000. Beech Aircraft's earnings climbed to $907,500 from $756,000 in last year's first quarter."

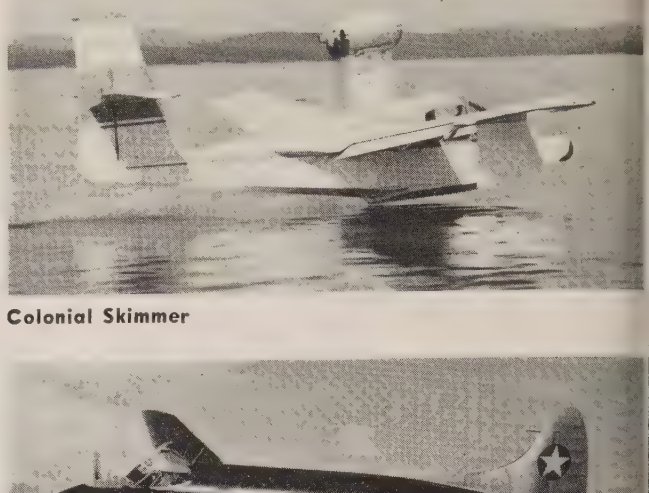
How did this miracle happen? Superb aircraft, more all-weather utility, more general efficiency, lower-cost operation and better maintenance—but above all the growing realization that owned aircraft supply the fastest form of uninhibited transportation—route and schedule free!

In an industry (aviation) which today represents "the largest single demand for capital" (*The Harvard Business Review*)—the fastest *growing* factor is the demand and supply of business aircraft. Never before has the demand been so great for better aircraft, better equipment, better service and facilities to do one all-important job—keep American industry expanding!

That demand *is* being met—by the suppliers to whom Skyways dedicates this issue. These suppliers will be "laying it on the line" for all to see at Philadelphia this month, in the shadow of the Liberty Bell, an appropriate setting. This is the big opportunity to inspect and examine all the offerings in this annual showcase. Also to discuss, swap and acquire information for better and safer utilization of aircraft in your business.

A big, successful turnout will strengthen business aviation's future against its adversaries, its fair-weather friends. The flight plan calls for a happy landing for all members and friends of the National Business Aircraft Association. See you there!

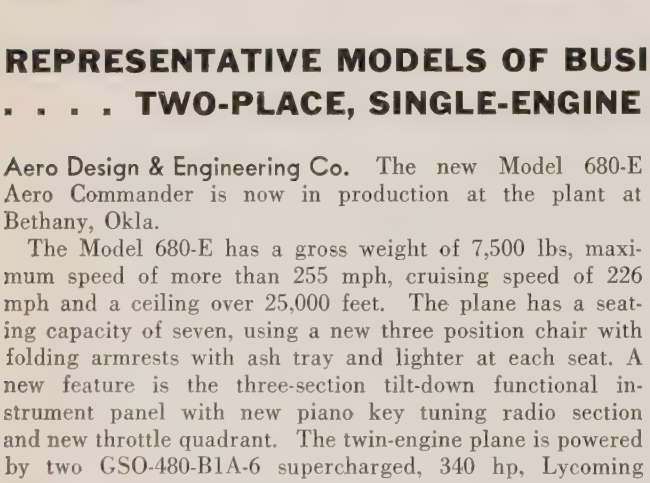
Aero Design & Engineering Aero Commander



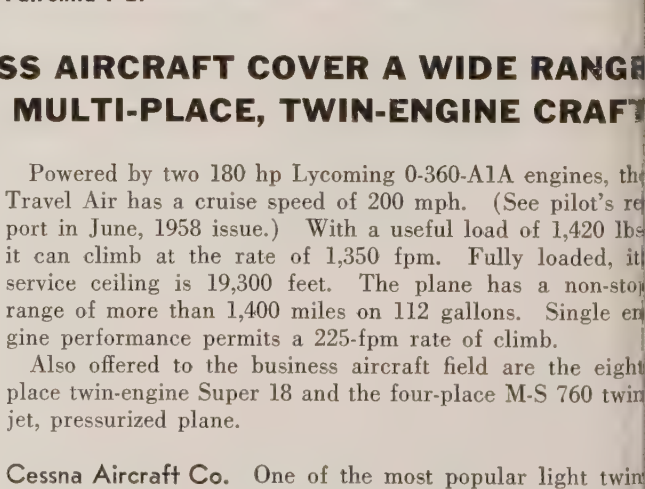
Colonial Skimmer

Beech Travel Air

DeHavilland Dove



Cessna 310B



Fairchild F-27

REPRESENTATIVE MODELS OF BUSINESS AIRCRAFT COVER A WIDE RANGE . . . . TWO-PLACE, SINGLE-ENGINE TO MULTI-PLACE, TWIN-ENGINE CRAFT

Aero Design & Engineering Co. The new Model 680-E Aero Commander is now in production at the plant at Bethany, Okla.

The Model 680-E has a gross weight of 7,500 lbs, maximum speed of more than 255 mph, cruising speed of 226 mph and a ceiling over 25,000 feet. The plane has a seating capacity of seven, using a new three position chair with folding armrests with ash tray and lighter at each seat. A new feature is the three-section tilt-down functional instrument panel with new piano key tuning radio section and new throttle quadrant. The twin-engine plane is powered by two GSO-480-B1A-6 supercharged, 340 hp, Lycoming engines. Range with 30 minutes reserve at 15,000 feet, 55% rated power, is 1,400 miles.

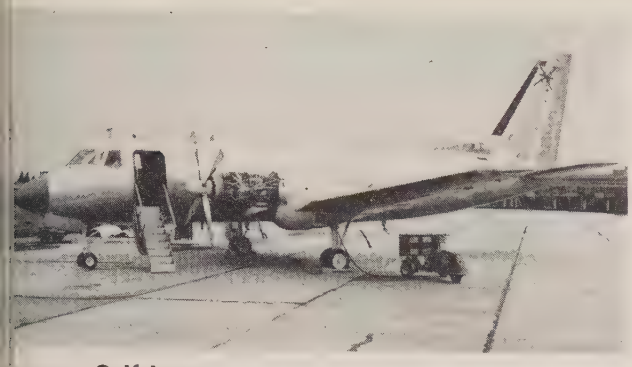
Beech Aircraft Corp. Latest Beech offering to the business aircraft field is the twin engine Travel Air. It is designed to fill a price gap between the four-place single-engine Bonanza and the six-place Twin-Bonanza.

Powered by two 180 hp Lycoming 0-360-A1A engines, the Travel Air has a cruise speed of 200 mph. (See pilot's report in June, 1958 issue.) With a useful load of 1,420 lbs it can climb at the rate of 1,350 fpm. Fully loaded, its service ceiling is 19,300 feet. The plane has a non-stop range of more than 1,400 miles on 112 gallons. Single engine performance permits a 225-fpm rate of climb.

Also offered to the business aircraft field are the eight place twin-engine Super 18 and the four-place M-S 760 twin jet, pressurized plane.

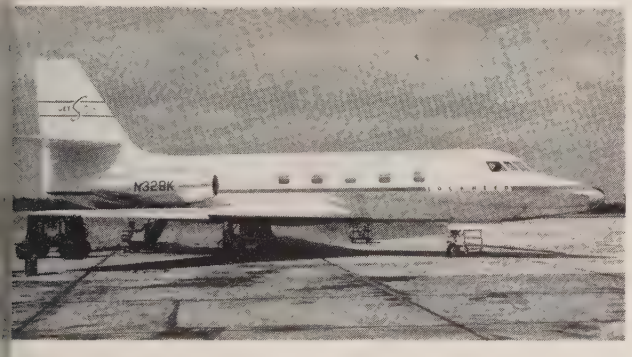
Cessna Aircraft Co. One of the most popular light twins on the business market today is the five-place Cessna 310B. It has a cruise speed of 213 mph and has fully retractable landing gear. Powered by two Continental 240 hp engines the 310 went into production in late 1954.

More than 750 of the planes have been manufactured. The 310 is winner of a light twin evaluation conducted by the U.S. Air Force to meet the needs for an administrative



umman Gulfstream

lio Courier



ckheed JetStar

d light cargo mission airplane.

Other aircraft in Cessna's business line are the four-place 2, 175, 180, 182, Skylane and the new two-place model 150 hich will be unveiled at the NBAA Meeting this month.

olonial Aircraft Corp. Powered by the Lycoming 0-360 0 hp engine, the Skimmer IV combines utility, perform-ce and efficiency in an amphibious aircraft. Produced at nford, Me., the four-place Model C-2 Skimmer IV has a uising performance up to 130 mph.

The "pusher" engine is mounted above and behind the ading edge of the wing. This permits the wing to act as shield protecting engine and propeller from flying spray. An extremely slow landing speed enables the Skimmer land on any strip and stop within 400 feet, the company aims. One reason for this is the "hi-lift" flap which also akes the plane suited to remote hunting and fishing area peration as well as in undeveloped bush country.

eHavilland Aircraft Co., Ltd. The twin-engine Dove, hich carries up to six passengers, is manufactured by de-avilland at Hatfield, England. The executive transport is owered with the DH Gipsy Queen 70 Mark 2 engine.

Gross weight of the craft is 8,800 lbs which includes a useful load of 2,791 lbs with six passengers. Maximum cruise speed is 202 mph; maximum range, 785 miles at 8,000 feet. Normal cruise is 179 mph with range of 875 miles using 32.8 gph.

Engines, complete with oil tank and all accessories, form self-contained units, detachable and interchangeable.

DeHavilland's Heron, larger executive version has four engines and carries up to eight passengers.

Fairchild Engine and Airplane Corp. F-27 made its historic maiden flight last spring. The twin-propjet transport is in the 300 mph class. It is the first twin-engine, turbine powered aircraft produced in the U.S. and the first designed specifically to meet the requirements of short-to-medium range corporation and airline operations. It is pressurized and air conditioned.

It is powered by two Rolls Royce Dart engines and is completely air-conditioned and pressurized. First delivery of the F-27 was made last June to West Coast Airlines. The plane is on order by 15 airlines in the U.S., Canada, and South America. Some eight corporations have ordered the plane for business use. The F-27 is being delivered to Piedmont Airlines, outstanding local service carrier.

Grumman Aircraft Engineering Corp. The Gulfstream prop-jet executive transport is Grumman's re-entry into the commercial aircraft market since the Korean War.

Designed as a "realistic" executive aircraft, the Gulfstream will undergo a rigorous flight test program to obtain CAA 4b certification prior to first delivery airplane next year.

The Gulfstream will be powered by two Rolls Royce Dart turbo-prop engines. Pressurized, the plane has a maximum cruise speed of 370 mph at 25,000 feet. It can carry 12 passengers. Capable of operation from runways under 4,000 ft long with full load, the plane will have a maximum range of 2,200 miles.

Helio Aircraft Corp. The only Short Take-Off and Landing (STOL) airplane designed, manufactured and CAA-certificated in the United States is the Helio Courier. Product of the Norwood, Mass., firm, the Courier is finding its unique qualities of considerable value in jungle flying.

Takeoff and landing distance required in no wind, with four passengers, is 75 yards; over a 50-ft obstacle, 165 yards. Cruising speeds range from 30 to 160 mph. Powerplant is a Lycoming 260 hp geared engine. High lift slotted flaps are 74% of the 39-ft wing span.

Lockheed Aircraft Corp. Straddling the present and the future is the executive JetStar. The ten-passenger aircraft, undergoing evaluation testing by the Air Force, is powered by two Wright TJ-37 (Bristol Orpheus) engines. (See pilot's report in August, 1958 issue.)

Slightly smaller than a DC-3, the JetStar is 58 ft 10 in. long, 7 ft 1 in. wide and 20 ft 6 in. high. Range with standard fuel load is 1,785 miles. Standard fuel capacity is 1,676 gallons.

Produced at Lockheed's Marietta, Ga., plant, the plane will be offered in a four-engine version as soon as GE J-85, Fairchild J-83 and Pratt & Whitney JT-12 engines are available.

Normal cruise speed is 510 mph. Maximum rate of climb at sea level for normal configuration is 6,400 fpm. Pressurization maintains an 8,000 foot level at 45,000 feet.

Mooney Mark 20

Piper Comanche 250

Northern Bellanca Cruisemaster

Trecker Royal Gull

North American Aviation Sabreliner

Vickers Viscount

Mooney Aircraft Inc. The four-place Mark 20 model by the Kerrville, Tex., company has been CAA-certificated since 1955. The plane features the NACA laminar-flow wing section and an all-metal fuselage.

In a Skyways pilot's report (January, 1958, page 13) the Mark 20 received a very favorable reaction from author-pilot Chuck Banfe. "There are no trim tabs . . . Each control moves the entire surface. It gives the Mooney a big-plane feel when changing trim and makes for a more stable-flying aircraft. Consider that the plane has a 107 mph differential between maximum cruise and stall, and you have a bird's eye view of how stable and clean it is."

Range at optimum cruise is 750 miles in 4.6 hours. It is powered by a Lycoming 0-320 150 hp engine.

Northern Aircraft, Inc. New plastic nose cone and doors and a new two-tone paint design mark the 1958 Bellanca Cruisemaster. Tubular steel fuselage frame of bridge-type construction is reportedly stressed higher than any other private airplane on the market.

The four-place cabin has double sound barrier insulation, and extra thick windows and windshield to cut noise to minimum. The plane, manufactured at Alexandria, Minn., is powered by a Continental 0-470K 230 hp engine. Top spee is 206 mph, cruising speed, 196 mph.

The craft has all-wood wings which have greater weig to-strength ratio than any competing low-wing airplane the same class, the company claims, decreasing the pow loading with resultant speed gains over others of class.

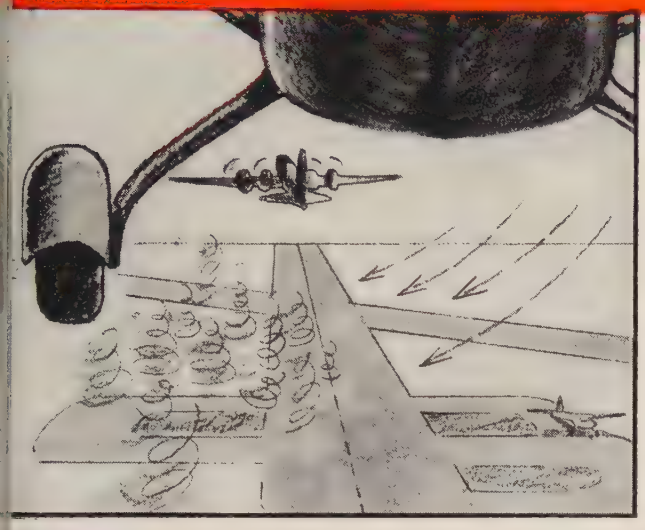
North American Aviation, Inc. Sabreliner, capable cruising at 500 mph, can carry as many as ten persons. T jet utility transport is powered by two General Electric lig weight J-85 engines and can fly non-stop halfway across t United States. It has a completely self-contained startin system and entrance stairway and can operate from near any field in the country.

It is 43 ft long, has a wing span of 42 ft and a gross tak off weight of 15,320 lbs. It will cruise at 39,000 feet and h a top speed of 575 mph.

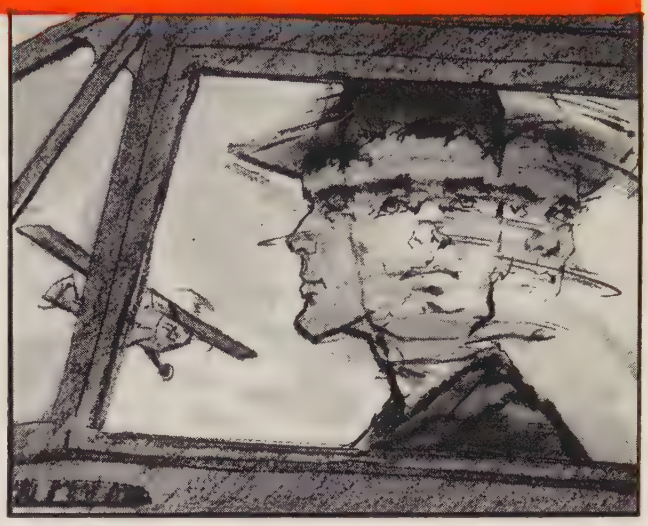
The plane can be operated for one-third the cost p nautical mile of such prop-driven twin-engine aircraft as t DC-3 or B-25, according to NAA.

Built to comply with CAA regulations, the airplane h an extra-wide windshield to give the pilot visibility f maximum flying safety under all traffic conditions.

WING TIPS



ROP WASH. As you know, when the giant four-engine anes of today take off, they create tremendous air turbu- nce, or prop wash. You're well aware of the havoc this n cause small planes, if you've ever tried to land one on e same strip, under these conditions. Suggestion: to be n the safe side . . . come in on the windward — or clear — de of the strip.



SKY WATCH. Everybody knows that boredom causes accidents. Since this is particularly critical in the air, it's a wise pilot — no matter how experienced he may be — who makes a constant effort to keep alert: checks his instruments frequently, studies the sky for weather clues and other aircraft. When accompanied by others, it pays to organize a sky watch.

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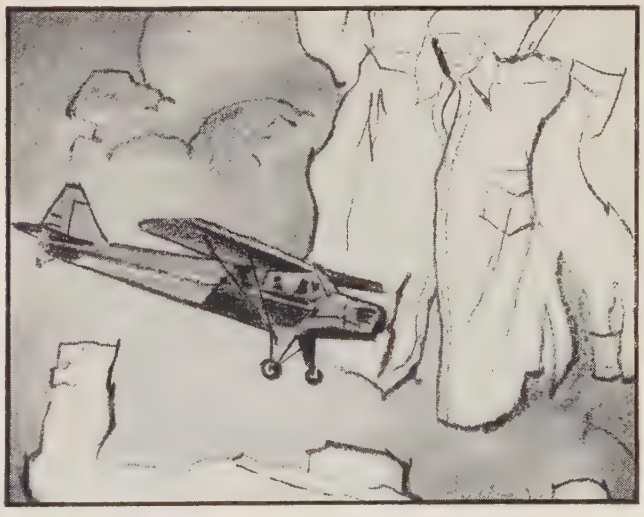

WHITE ISN'T RIGHT. Did you know that light-colored shirts reflecting in the windshield, particularly at night, can give the illusion of clouds? With air lanes as crowded and fast-moving as they are today, it's a good idea not to wear anything in the cockpit which might interfere with vision. Therefore: white just isn't right!

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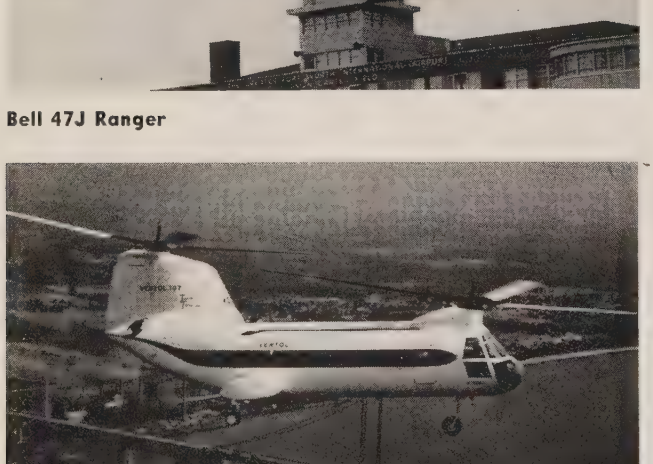
Pacific Airmotive Corp., Burbank, Cal.
Southwest Airmotive Co., Dallas, Texas
Timmins Aviation Ltd., Montreal, Canada

Aerocar Aero-Plane

Bell 47J Ranger



Vertol 107

Piper Aircraft Corp. The Comanche "250" (PA-24) boasts a top speed of 190 mph. This most recent addition to Piper's line of business aircraft is powered by a Lycoming 250 hp engine. Cruising speed at optimum altitude is 181 mph. The plane has a 1400 fpm rate of climb. Laminar-flow wing and single-piece combination elevator-stabilizer contribute to model's efficiency. Both 250 hp and 180 hp Comanches are available. The latter was subject of a pilot's report in Skyways, December, 1957. Cruise range of the "250" (75% power, sea level, 60 gals. fuel) is 4.3 hours or 740 miles. Other business aircraft models by Piper are the twin-engine Apache and the Tri-Pacer.

The four-place Comanche can carry a useful load of 1200 lbs. Baggage capacity is 200 lbs; service ceiling, 20,000 ft.

Trecker Aircraft Corp. The twin-engine amphibian Royal Gull is the name given the Italian Piaggio P.136 for sales in North and South America. Assembled and distributed by Trecker at Milwaukee, Wisc., the five-place craft has high gull wings. It is powered by two Lycoming GO-480 B1B 270 hp engines corresponding with the Piaggio P.136-L-1.

Besides the standard Royal Gull there is a Royal Gull Super 200. This has Lycoming 340 hp GSO-480-A1A6 supercharged engines.

The hulls and wings for both models are made b Piaggio in Italy and shipped to the Milwaukee plant. Th plane is assembled with all U.S.-built components.

At cruise speed of 156 mph, maximum range is 880 mile A retractable sea rudder operates with the air rudder f water taxiing.

Vickers-Armstrongs (Aircraft) Ltd. The turbo-prop powere Viscount is powered by four Rolls Royce Dart engines. is produced at Weybridge, England, in both custom-style executive and 48-passenger airliner versions.

A total of 378 Viscounts are now in service or on orde by 40 airlines and private companies. The Viscount Exec tive is an extra long range version. It can fly 2,450 mil with a two-hour reserve. Fuel is carried in bag-tanks in th wings. Standard capacity of 2,310 U.S. gallons can b increased to 3,198 gallons with additional slipper and lu gage-compartment tanks. Cruise speed with the Dart D Da-6 engine is 326 mph.

Aerocar Inc. The new model II Aero-Plane version of th Aerocar "flying automobile" was viewed for the first tim recently at the Longview, Wash., plant.

The four-passenger aircraft weighs 360 lbs less than i predecessor by removal of various automobile componen required for roadability of the original machine. A ne tricycle landing gear configuration has a nosewheel whic features a spring-oil arrangement expected to be near maintenance-free. The single leg spring main gear is original design. It has a double tapered spring installatio which flexes the landing gear leg along an "S" curve du ing landing impact.

Powerplant is Lycoming 0-320, 143 hp. Cruise speed "over 120 mph." Normal cruise range is "over 300 mile Seat belts and shoulder harness are standard equipment.

Bell Helicopter Corp., Fort Worth, Tex., will unveil t 1959 model of the 47J Ranger at the National Business Ai craft Assn. show at Philadelphia, Pa. this month. Detai of the new model will be released at that time. Howeve Fred Roscoe, commercial sales manager, said that sever improvements are incorporated in the new 47J that exte the performance, utility and comfort of the business aircra

There are more than 60 Bell Model 47J helicopters service with private businesses, commercial charter ope ators and government agencies, performing many uses.

Geographically, the four-place, 260 hp Ranger is ope ating in Ethiopia, Canada, Algeria, Chile, Brazil, Switz land, Norway, Italy, Venezuela, Colombia, Cuba, Swed and the United States.

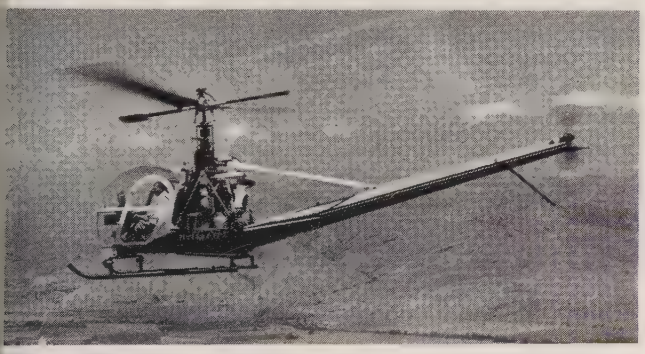
Vertol Aircraft Corp. A twin-turbine helicopter is this co pany's new Model 107. Developed at Morton, Pa., as a co pany project, started in May, 1957 the prototype has be in flight test since early April of this year.

The prototype configuration is anticipated to be the fi in a line "which will continue to grow in size and load car ing ability as engines of higher horsepower become ava able." The tandem rotors provide for maximum cabin a and permit a larger allowable center of gravity travel th other designs. Model 107 cabin contains 795 cubic nearly one-third more than the piston-engine Vertol 44.

Cabin of the amphibious copter is longer, higher a wider than the Model 44, but overall length is eight shorter. Seven of the Army-ordered YHC-1's, Army des nation, will be powered with twin General Electric T turbo-shaft engines and three with twin Lycoming T-53's.

Republic Alouette II

Sikorsky S-62



Hiller 12E

Republic Aviation Corp. The only jet-powered helicopter currently being operated in North America is the Alouette II, assembled and marketed on this continent by the Long Island, N. Y., firm.

The 'copter is five-place, medium range (345 miles) and capable of 110 mph speed. It is powered by an Artouste IIB-1 400 hp gas turbine engine. A special governing system eliminates the need for pitch and throttle coordination. Sud Aviation of France designed the craft.

The first operational report on the Alouette was released to Republic by Aetna Helicopters, Inc., of Etna, Calif. "Flying in the Gila National Forest, New Mexico, under contract to the U.S. Forestry Service, Aetna has established amazing operational figures of 214 passengers and 54,623 lbs of cargo carried (not counting pilot and fuel) in less than 100 flight hours and requiring little more than one-half hour maintenance per hour of flight."

Sikorsky Aircraft. The S-62, a revolutionary new helicopter, was flown publicly for the first time on May 14, 1958, only 11 months after it was designed. The turbine-powered aircraft is the first amphibious helicopter ever built with a flying boat type hull.

The gas turbine powered helicopter carries up to 12 passengers. It has a payload increase of 700 lbs and a cruising speed gain of 20 mph over the S-55 model. Other features include lower noise levels and less vibration as a result of the turbine engine and unequalled hovering ability when flying in high altitude areas or in hot weather, with the engine power at sea level fully available up to 17,000 feet. Owners of S-55's can turn the craft in for retrofitting.

Hiller Helicopters. Now being introduced commercially at the Palo Alto, Calif., plant is the 12E model, the highest powered helicopter in the two to four place class. The 12E employs the basic airframe of the new Army H-23D which has been operational since January 1958.

In addition to its top power (Lycoming VO-540 305 hp) the 12E features such improvements as a refined rotor system, new long-life transmission, an advanced tail rotor and drive system and new accessories. Compared with its predecessor, the three-place 12E will transport 65% more payload, 50 miles further and hover in ground effect four times higher.

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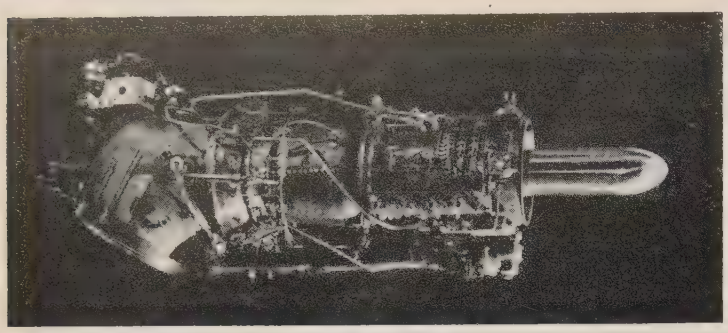
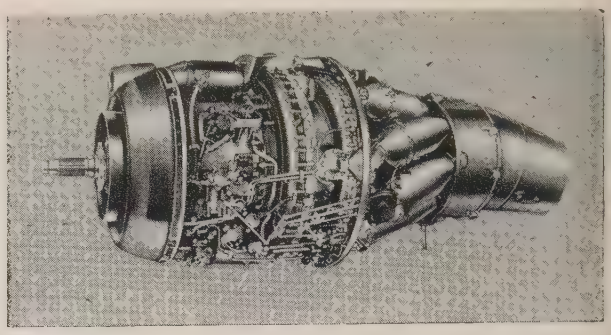
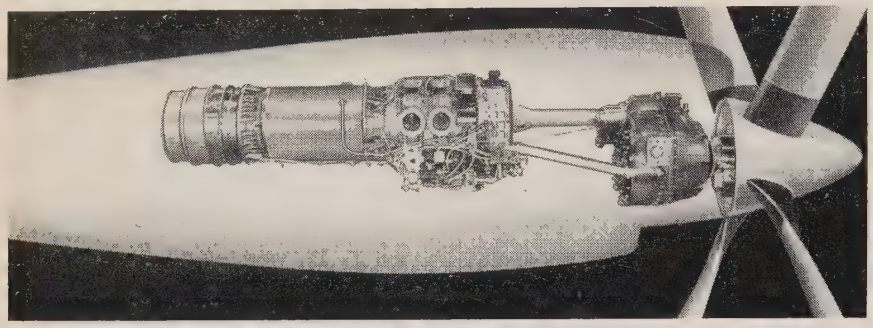


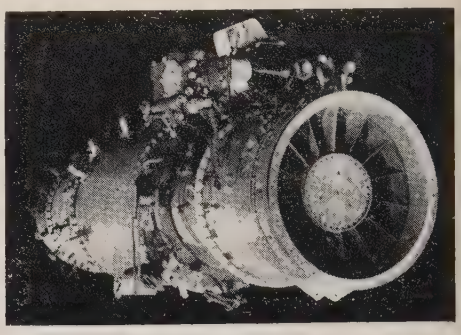
General Electric's T58-GE-6



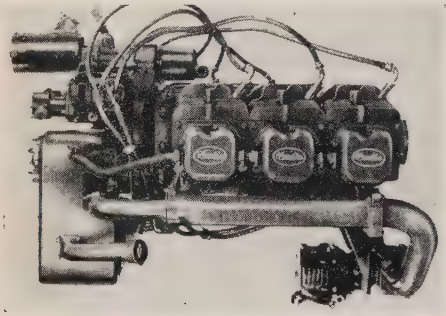
The Rolls-Royce Dart



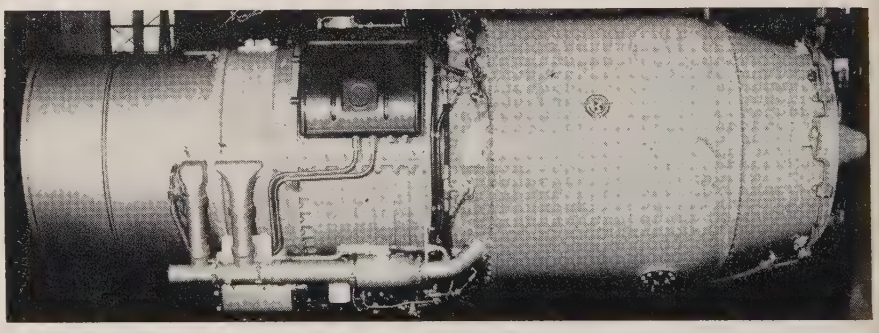
Turboprop engines by Allison Div



Pratt & Whitney's new JT-12



Franklin Engine Model 6V-335-A and -B



The TJ-37 engine

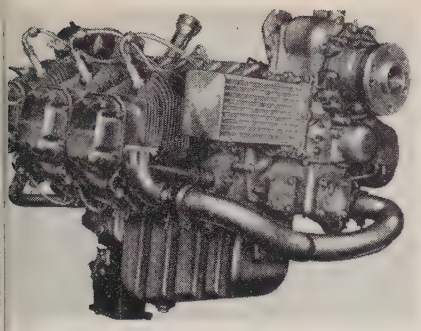
POWER PLANTS LARGE AND SMALL RECIPROCATING TO ROCKET ENGINES— DESIGNED TO KEEP BUSINESS AIRCRAFT IN THE AIR

General Electric's T58-GE-6 is latest in the T58 engine model line. Designed for application in helicopters (Sikorsky HSS-1, S-61 and S-62. Vertol H-21D, Kaman HU2K-1, Vertol V-107) the engine includes new features of main reduction gear as optional item; power takeoff is in any one of three positions and either forward or aft; three-position exhaust; torque sensor; qualified on JP-4, JP-5 fuel. In utility helicopter, the T58 is lightweight. Studies show that on a 2½-hour mission, T-58-powered copter can carry 45% more payload than a helicopter powered with any other known engine.

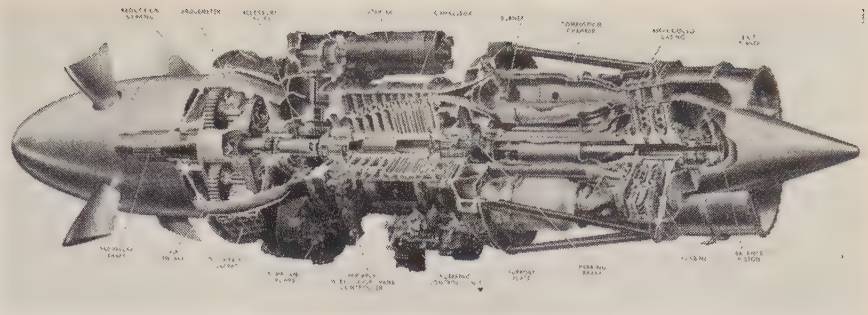
Turboprop engines by Allison Div. of General Motors are being demonstrated on a Convair 340. The Allison "prop-jets" add speeds up to 90 mph faster than the piston powered aircraft.

Combustion chamber of the Model 501-D13 is cannular. The engine is rated at 3,750 eshp for takeoff under static, sea level, standard day conditions. This is made up of 3,460 shaft horsepower and 290 equivalent horsepower from the jet thrust. The power section of this engine has an 18-in diameter and develops approximately 8,000 lbs of thrust for takeoff. Average rate of climb to 15,000 feet in the converted Convair is increased from about 700 fpm to 2,000 fpm.

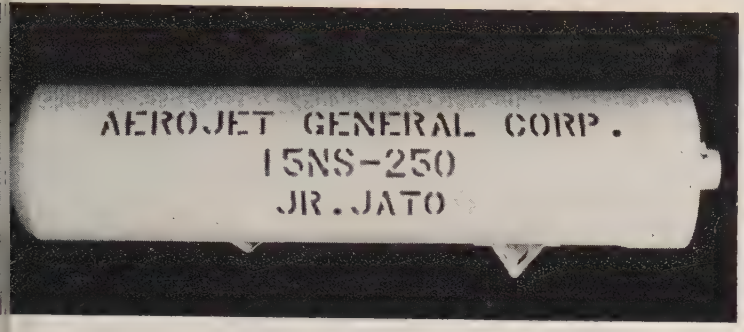
Franklin Engine Model 6V-335-A and -B is designed for use in a vertical position in helicopters. It is a recent development of Aircooled Motors' Franklin 335 cubic



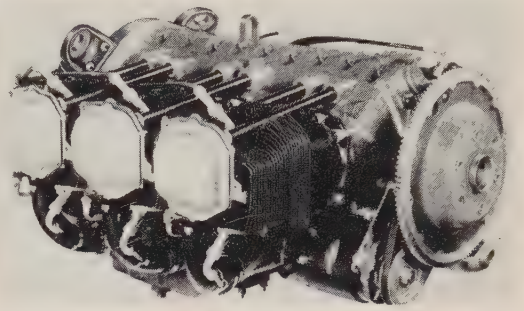
six-cylinder Continental GO-300A



The Napier Eland turboprop



ojet-General's "Jr. Jato" 15NS-250



Lycoming Model O-540-AiA

engine. 200 hp version can be converted to 210 hp. lore than 5,000 of the 200 hp engines have been luced to power Bell and Hiller helicopters.
he new "210" with 210 hp sea-level rating, maintains ll 200 hp at 1500 ft. Operating in hot weather, the ne maintains 200 hp at 110°F. Engine weight is 320 slightly less than the weight of the 200 hp version.

Rolls-Royce Dart is a centrifugal flow prop-jet en- produced by Rolls-Royce of Canada Ltd. Versions ,740, 2,100 and 2,350 total equivalent horsepower are roduction. The Dart is fitted in airline and executive ions of the Vickers Viscount, the Grumman Gulf- am and the Fokker and Fairchild F-27. It is specified for the British Handley Page Herald. Powering the ount, the Dart first entered scheduled airline oper- n in 1953. By June of this year, the engines had ed 5,000,000 hours in world-wide service.

tt & Whitney's new JT-12 turbojet engine has com- ed significant pre-flight tests, according to the com- y. The powerplant marks the entry of Pratt & Whitney raft into the smaller jet engine field.
he JT-12 was designed specifically for economical duction. It has an initial rating of 2,900 lbs of dry ic thrust for takeoff and weighs 430 lbs.
his provides about 6.75 lbs of thrust for each pound ngine weight. The engine is slated for possible use he Lockheed JetStar and other coming executive jets.

TJ-37 engine is a joint development of the Curtiss- ght Corp. and Bristol Aero-Engines Ltd. of Filton, land. With excellent characteristics for jet-powered iness aircraft, the TJ-37 powers the Lockheed JetStar. he engine has a seven-stage, axial flow compressor viding a compression ratio of 4.4 to 1 and an airflow 81.6 lbs/sec. Seven cannular, combustion chambers so arranged that they can be removed and replaced ividually. Engine weight is 990 lbs. Takeoff thrust rate ,850 lbs; resultant engine thrust-weight ratio is 4.9.

six-cylinder Continental GO-300A 175 hp geared engine has a .75 to 1 gear ratio. As used in the Cessna 175 this geared engine provides speeds up to 147 mph.

The engine is rated at 3200 rpm using 80 octane fuel. The crankshaft is geared to the propeller shaft instead of being directly connected to the propeller. Compression ratio is 7.31 and displacement is 300 cubic inches. The engine is equipped with a set of reduction gears for the propeller drive which results in the prop turning at three-fourths of the engine crankshaft speed. This provides a prop speed of 2400 rpm at the rated engine speed of 3200 rpm.

Aerojet-General's "Jr. Jato" 15NS-250 Aircraft Rocket Engine, CAA certificated, joins its larger counterpart the 15KS-1000-A1 Rocket Engine as a standby power source for civil aircraft. It is specifically designed for individual or multiple installation in single or multi-engine airplanes up to 10,000 lbs gross weight. This solid propellant rocket engine measures 6″ in diameter by about 26″ in length and weighs some 50 lbs installed, including mounting structure and ignition circuitry. It instantly delivers 250 lbs of thrust (about 100 hp) on demand for 15 seconds duration for any emergency power requirement.

The Napier Eland turboprop engine, rated at 3,500 ehp for takeoff on the Convair 340, gives the 340 an additional 2,000 hp compared with the standard piston engine.

The turboprop engine has a 10-stage axial compressor, six combustion chambers and a three-stage turbine in an 1,800 lb unit. Gross weight increase is 6,000 lbs with correspondingly higher payloads.

Lycoming Model O-540-AiA, a new six-cylinder direct drive engine, develops 250 hp with a weight of 396 lbs. First application is on the Piper Comanche. The engine measures 25.81″ in height, 33.37″ in width, 37.22″ in length. It uses minimum 91/96 octane fuel and features dynafocal mounting. Standard engine includes Delco-Rem starter, generator, voltage regulator, Marvel-Schebler MA45 carburetor and Bendix S6LN20, right, and SyLN-21, left, magnetos.

INCREASING UTILITY, SAFETY AND EFFICIENCY, A WIDE VARIETY OF CONVERTED AND MODIFIED MODELS SERVE BUSINESS AVIATION

SOUTHWEST AIRMOTIVE CO. Sitting for 26 years at one of the Hemisphere's busiest business flying crossroads. Love Field, Dallas, Tex., SAC is considering adding new hangars and ramp before the shine has dulled on the plush facilities opened early this year. (See May, 1958 issue, page 20.)

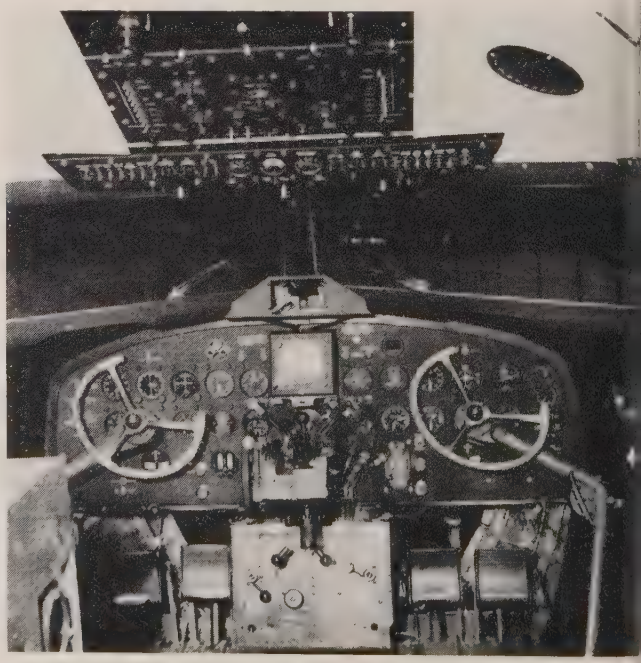
The firm's versatility is one of the principal factors contributing to SAC's success. To wit: transient service pumping fuel and hospitality in behalf of 15,000 planes a year on a 24-hour day, full week basis; complete deluxe terminal services and restaurant; aircraft tie-down and hangar storage; aircraft overhaul and conversion (illustration is SAC interior of a Lockheed Lodestar); propeller overhaul; radio and instrument overhaul through other organizations to whom it leases shop space (Associated Radio and Aero Instrument Supply), and much more.

It adds up to an investment in the neighborhood of $7 million. Versatility and quality—and boundless faith in aviation—have paid rich dividends.

PIEDMONT AVIATION, INC. Large executive aircraft maintenance work handled at Winston-Salem, N.C. is done by the airline division in their maintenance facilities. Work is done by airline mechanics and subjected to airline inspection procedures. The airline engineering staff is available for working out details of any modifications and improvements the customer desires.

The illustration shows a cockpit conversion on a DC-3 airplane. All hydraulic controls and the de-icer boot control are located in the small box at the bottom center of the photo. The PPI scope is centrally located for viewing by both pilot and copilot. The overhead electrical and radio panels replace the escape hatch. The cockpit windows were enlarged to provide escape openings. Both bulkheads behind the pilot and copilot were removed and all hydraulic components relocated further aft in a new low cabinet which forms part of the buffet. The main electrical "J" bow stands vertically at the left side of the picture and the radio "J" box is horizontal and has a cover to provide a work area behind the pilot.

Piedmont Aviation, CAA certificated, does maintenance work on aircraft ranging in size from the DC-3 down.



ORTHWESTERN AERONAUTICAL CO. Designated a AA repair station in 1946, Northwestern was organized to

rve the corporate aircraft owner. Specializing in the larger ulti-engine aircraft, such as Douglas DC-3 and Lockheed odestar, the company now has two facilities. One is lo-ted at Holman Field, St. Paul, Minn., where the firm spe-ializes in the overhaul of Pratt and Whitney R-985 and -1830 engines and Wright R-1820 engines.

A second facility is located at Wold Chamberlain Field Minneapolis where maintenance and overhaul of aircraft handled. Their shops can handle all types of major re-airs and modifications, either structurally or electronically. he company also operates a complete mechanical and elec-rical accessory shop overhauling such equipment for sev-al airlines as well as regular business aircraft cutomers.

Northwestern is distributor for Aerojet-General JATO ocket engines, Winslow filters, Stewart Warner heaters and ratt and Whitney engines.

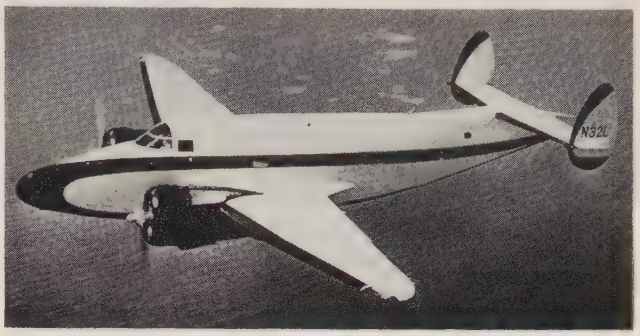
XECUTIVE AIRCRAFT SERVICE, INC., has headquar-rs at Redbird Airport, Dallas, Tex. In the past year the ompany has completed nine major overhaul, modification, d conversion jobs.

The photograph shows the cockpit and forward compart-ent of a DC-3. It has the lowered hydraulic panel enclosed cabinet with map table and observer's seat mounted on acks; radar scope and controls mounted in cabinet at left, ith circuit breaker panel on forward side of radar cabinet; nlarged hydraulically actuated cockpit side windows; one-ece bird-resistant windshields; and long range adjustable ilot chairs. This airplane also has wet wings with squared ps (center section tanks removed and radio equipment stalled in area); complete "Maximizer" modification kit wheel doors, tail wheel fairing, aileron gap closure, modi-ed nose cowling, exhaust system modification, and oil cooler iring); new cabin interior; four large picture windows ith remaining windows enlarged; and flush mounted JATO.

Dollar volume for the last fiscal year was slightly over 1 million.

PACAERO ENGINEERING CORP. The Learstar conversion of the familiar Lockheed Lodestar is this company's outstanding contribution in this field. The executive aircraft was purchased by 13 firms during the past fiscal year resulting in a total dollar volume of just under $6 million.

The Mark I Learstar was the first business aircraft to fly the polar route on a flight from Santa Monica, Calif., PacAero base, to Dusseldorf, Germany. (See SKYWAYS, April,



1958 page 12.) Powerplants on this model are two Curtiss-Wright 1425 hp engines. Normal cruise is 280 mph at 55% power at 10,000 ft.

Another PacAero project is the Modernization Kit for the Beech Model 18. The power package modification results in an increase of about 285 lbs in pay load, improved cruise and single engine climb performance. Cruise increase is 14 mph (20 mph when wheel well doors and stabilizer angle changes are incorporated). These and other combined features contribute to increasing the safety performance of the twin Beech.

HAYES AIRCRAFT CORP. Undergoing a periodic inspection for relicensing is this Bendix-owned B-25H at this

Birmingham, Ala. facility. To improve the plane's airworthiness certain modifications were made, including reinforcement of the aileron hinge brackets, wing attachments and elevator hinge brackets; upper wing spar cap was modified to preclude cracking. The hydraulic system lines is the fourth general modification item in the company's B-25 modification and modernization program.

Recently designated as a CAA authorized repair station, Hayes' certification covers seven categories in which official ratings specify the classes of work the company is to perform. They are: airframe, propeller, instrument, radio, accessories, emergency equipment and special inspection procedures—magnetic particle and dye penetrant inspection.

Two years ago Hayes repaired a damaged Lodestar for the B. F. Goodrich Co. and since then has worked on B-25 executive aircraft and smaller business-type aircraft for several companies. As a repair station the company has its own CAA designated maintenance representatives who are authorized to make final inspection.

Conversions and Modifications

OAKLAND AIRMOTIVE CO. The Centaurus, executive conversion of the Navy PV-2, is one of the newest business aircraft conversions in the field. It is approved for standard airline pressurization. In obtaining CAA approval, the Oakland, Calif. company made many major engineering changes designed to improve performance of the PV-2.

One of the oldest firms in the United States specializing in business aircraft overhauls and conversion, Oakland Airmotive was founded in 1949 by E. H. Gough and associates. The company has turned out approximately 100 major conversions of business aircraft since its beginning.

The Centaurus has a cruising speed of 280 mph, range of more than 2,000 miles, approved gross weight of 33,000 lbs and a useful load of more than 14,000 lbs. Its interior can be customed designed for up to 14 passengers.

A recent overhaul and conversion was made of a 25-year-old Boeing 247 which was completely re-built for the Standard Oil Co. to be used for Canadian exploration work. Oakland Airmotive's re-building of the spars made even Boeing engineers "sit up," according to Gough.

FLIGHT ENTERPRISES, INC. Typical of executive aircraft conversions is the interior seating configuration shown here. Located at Bradley Field, Hartford, Conn., the company's hangars and shops cover more than 20,000 square feet of floor space.

Shops are equipped and manned to take care of the many phases of repair and maintenance of air-frame and engine, interior upholstery, seating and bunks, galleys, etc., the production of machined parts to close tolerances.

Modifications are designed and planned for efficient undertaking and completion. "Know-how" is a pre-requisite of all phases of aircraft repair, maintenance, design and development as practiced by Flight Enterprises, says the firm's president, D. C. Zipfel. This includes a wide and up-to-the-minute knowledge of advanced theory as well as a practical familiarity with the structural details of many existing types of aircraft, large and small, of the fixed and rotary wing types, powered by piston, turbo-prop or jet.

AIRESEARCH AVIATION SERVICE CO. The interior of a Convair 440, shown here, is designed for executive business use. This particular interior was awarded first prize in the large aircraft class at the recent Reading (Pa.) Aviation Forum.

The work table in the right foreground is removable so that the twin chairs with a similar pair opposite can be converted into sleeping facilities. The divan in the left foreground is berthable, also. Next in line on the left is a large storage cabinet. Conference table in the middle of the aisle is bordered by a curved divan and two full-swivel, reclining type executive chairs. The ottoman between the swivel chairs has interior storage space containing a hi-fidelity tape recording system with radio. In the next compartment are bunk type sleeping facilities. The extreme aft end of the plane contains lavatory facilities. Not shown,

but included in the aircraft's facilities are a secretarial chair and work table.

This division of the Garrett Corp. is the only CAA approved repair and overhaul base for private planes at Los Angeles International Airport, Calif. Among special accommodations is the air-to-ground radio service by which planes can make contact on a frequency of 123.0 mc from approximately 100 miles out.

DALLAS AERO SERIVCE, INC. One of Dallas' special services is modification of the Lockheed Lodestar increasing the speed by 30 mph. This program has a CAA supplemental type certificate.

A completely integrated fixed base facility for business, executive and private airplane operators, DAS is in its 32nd year at Love Field, Dallas, Tex. The company provides engine overhaul, accessory sales and overhaul, complete radio and electronics products, services, facilities, aircraft repair, overhaul and modification, hangar storage, instrument sales and overhaul, tank sealing service, line service and other special services.

DAS' total sales increased more than 42% in 1956 over 1955. In 1956, sales came to a total of $2 million as com-

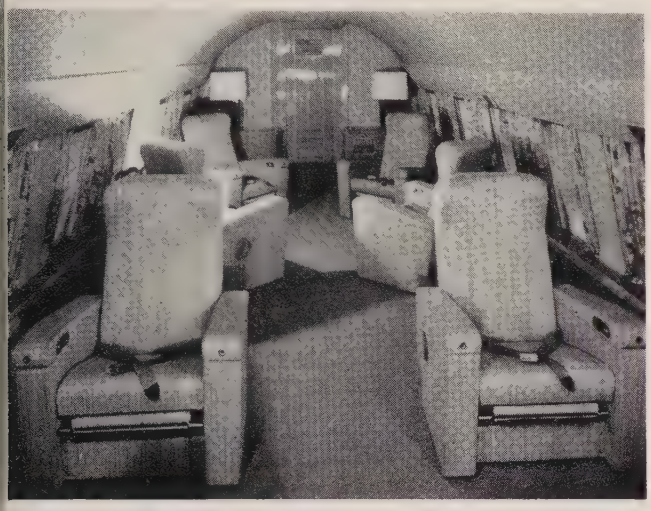
pared with $1.4 million in '55 and $800,000 in '54. Sales for 1957 were approximately $2½ million. Sales for this year are estimated at $3 million.

The firm is the largest overhaul center for the deHavilland Dove in the United States. It is the factory authorized overhaul agency for Dove engines and airframes.

L. B. SMITH AIRCRAFT CORP. The first and only Vickers Viscount executive conversions to be made in the United States have been accomplished by this Miami, Fla. firm.

Among unique features in interior treatments are swivel chairs, shown in the photo, and louver-blind window treatment. The company is an authorized U.S. Repair and Conversion center for the Viscount.

The L. B. Smith plant comprises 88,000 sq ft of hangar, factory and office space in a new million-dollar cantilever-



style building. Facilities include aircraft/aerodynamics engineering including special project, flight test, inspection; aircraft overhaul, modification, conversion service; aircraft seat and galley design and manufacturing (Aerosmith Products); interior design, manufacture and installation; line maintenance and customer service on a one-stop while-you-wait basis.

Conversion of the Viscount to a corporate executive aircraft includes design and installation of ventilation, air conditioning, communications, radar and electrical systems; design of interior; design of furniture; selection of materials (construction, woodwork, upholstery and fabrics); manufacture of furniture (seating, divans, cabinetry); and installation of interior.

HORTON & HORTON CUSTOM WORKS, INC. The major purpose in any business aircraft interior conversion is a pleasing balance between working efficiency for time-starved corporate executives and aesthetic decor providing much-needed in-flight relaxation.

By way of accomplishing this elusive goal, Horton & Horton of Fort Worth, Tex., has, in the past fiscal year, designed, engineered and fabricated the interiors of some 181 aircraft of all sizes. Cost specifications ranging from $3,000 to over $100,000 indicate the capacity of the firm's top-notch engineers and fabricators to master any size job. The engineer-plus-interior designer working team concept has enabled H-H to offer minimum "down time," so vital to hard-pressed corporate operations.

All the above has inevitably led to their commissioning to do original interiors for the latest jet-prop aircraft just coming into production. Southwest Airmotive, distributor for the brilliant, new Grumman Gulfstream, has placed their entire

responsibility for custom interiors in H-H hands. Shown here is DC-3 "airborne conference room" recently done for a happy customer.

FIELD AVIATION CO. LTD. with plants at the Municipal Airport at Oshawa, Ontario, and McCall Field, Calgary, Alberta, has been engaged in the repair, overhaul and conversion of corporate and commercial aircraft for the past ten years.

Projects undertaken include custom radio installations in Super E-18 Beechcraft (see photo), Lockheed and PBY aircraft; long range and dual fuel systems in Lockheed aircraft; tower modifications to PBY craft; Janitrol heater installations in S-55 helicopters, B-17's and PBY's; numerous specialized aerial photographic and airborne geophysical installations in Lockheed, B-17, PBY and Cessna aircraft; and several cargo conversion.

Volume of work in the past year totalled approximately $750,000. Plans were completed early this year for construction of a 40,000 sq. ft. executive aircraft hangar at McCall Field. It is expected to open in January 1959.

NAVICOM

In this special Suppliers' Issue, it is our wish to highlight the advances that have been made in electronic and other operational equipment that make possible the continued rapid increase in safe and efficient business flying. With the cooperation of the manufacturers whose engineering skills and hard-earned cash produced these advances, we would like to call our readers' attention to the latest in their respective lines.

If we should miss any, it will be because time limitations precluded receipt of the information prior to press time. We will pick up this ball in the Convention Issue and urgently direct your attention to the exceptional exhibits planned for the convention hall.

Meanwhile, to keep our readers abreast of operational developments vital to their use of the nation's airways, NAVICOM reports:

GAFPG Urges Changes in Pilot License Requirements

Leslie A. Bryan, Director, Institute of Aviation, for the University of Illinois and Chairman of the Executive Committee of the General Aviation Facilities Planning Group, has reported to the CAB, that while endorsing the intent of recent CAB pilot certification change proposals, GAFPG feels further modification is necessary.

Bryan said that while GAFPG did not feel the proposed increase in total flight time for a private certificate was justified, a broader training concept would benefit such pilots in cross country flying with greater safety and utility. Inasmuch as a significant factor in the increase of business flying is the personal business pilot, such proposals are aimed directly at him.

GAFPG proposes that the "Private" pilot rating be separated into "Primary" and "Advanced" classifications. Although not limited in the carriage of passengers, the first class would be restricted to single-engine aircraft on daytime flights under VFR and within a 50-mile radius! Solo cross-country flights would have no distance limitations, but would be under the supervision of an instructor on a log book endorsement basis for each flight. The hourly qualification requirements are not stated.

The second class would receive more complete training to include instrument indoctrination, radio navigation, night flying and control zone operation.

GAFPG also recommended the updating of syllabus materials for all pilots, particularly flight instructors.

Radio Failure Procedures

Despite the best efforts of designers, electronic equipment are sometimes going to fail in the air. The best of maintenance and periodic procedures cannot guarantee that a component part of a radio is not on the verge of an outage prior to takeoff on a fully-IFR operation. Although such an occurrence is happily the exception rather than the rule, it happens frequently enough with the increase in instrument airway flying to tie ATC up in knots, drastically limiting the capacity of the already inadequate system, not mentioning the hazard to the aircraft concerned.

When "CAR Sixty" was written, the present complicated and diverse airway system was not envisioned. Nevertheless, C.A.R. 60.49, Radio Failure, IFR rules, can be interpreted so as to provide some guide lines for the instrument pilot confronted with a *communications* failure while on the gauges. And if a *navigational* receiver failure is involved, it is hoped that proper pre-flight planning would have included provision for two operable nav systems as a prerequisite for takeoff IFR, or you are at the moment—VFR!

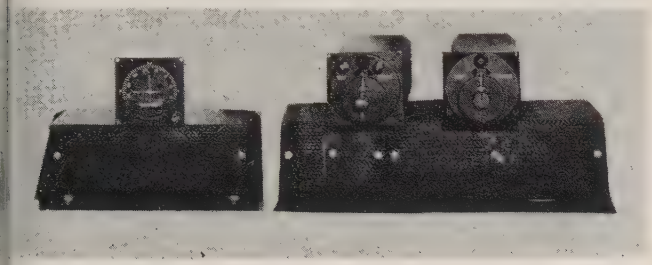
Some concern is raised as to the still current belief in some pilots' minds as to the *propriety* as well as the priority of use of the various systems, LF vs VHF. If on a Victor airway flight plan, the pilot should plan to continue, if practicable, on the same basis and plan a VHF (ILS or VOR) approach at his destination according to the weather and approach system availability. And, if on a Low Frequency airway flight plan, he would be expected to use the same reasoning.

As to the question of an enroute or a terminal situation which confronts the pilot with the alternative to the system which he has available, he should make every effort commensurate with safety of the flight to duplicate the route or approach path of the acknowledged clearance or flight plan. The pilot can feel assured that ATC will protect his flight accordingly within any reasonable proximity to his route. Similarly, on approach, in accordance with 60.49 they will allow for the possibility that he may be unaware of or unable to comply with the type of approach being made and will protect the appropriate altitudes on-down as rapidly as possible based on the computed or flight planned arrival time at the "radio fix serving the airport" (again, VHF or LF system, both will be taken in consideration).

Of course, if the pilot receives further or amended ATC instructions "in the blind" via his navigational equipment, he may *elect* to conform to the new instructions or abide by the above rule. It is unlikely that he will be issued any such instructions which will do other than speed his progress. If under radar surveillance, obviously ATC will issue instructions for acknowledging maneuvers and he will in effect be back in two-way control. Also, for your comfort, ATC is familiar with the pilot's version of calculating your own "EAC" (Expect Approach Clearance Time)—"add five minutes for the wife, five for each kiddy, etc. . . .!"

ear, Inc.

A major problem confronting the owner, operator or potential buyer of an aircraft today is the basic requirement or safe, accurate navigation under all conditions and reiable communications at all times. It doesn't take a proosed regulation change to convince any experienced pilot f the necessity for assuring accuracy under all conditions nd there is no more exasperating situation as unreliable r malfunctioning communications in a tense operational sitation. It is for this reason that the radio manufacturing ndustry, while supporting the opposition to violent displaceents of quality radio already sold to their customers, have een long set on the path of equipment designed to meet tandards well above the required minimums but at cost evels opening a market to the majority of business aviation. ear's latest equipment, the LNC NAVCOM series 100 and 00 are designed to meet the above requirements plus a unit ype construction that will enable addition and replacement ith virtually no time consuming labor cost.

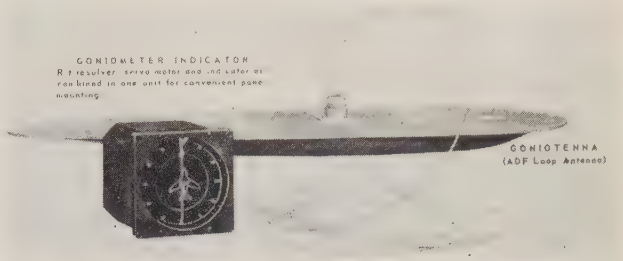


The LNC 100 includes a 190 channel, crystal controlled, 10 mc spaced receiver (capable of expansion to 480 channel, 05 mc spacing to meet requirements for years to come) adustable squelch control, provision for paired glide slope election (glide slope modules can be added.) Omni/Loc ndicator all panel mounted plus power supply, nav conerter remotely mounted on special shockmounts. The total veight of basic system is under 14 lbs. The transmitter is 90 h .10 mc spaced expandable to 280 ch .05 mc spaced. Power utput exceeds 4 watts.

The NAVCOM LNC 200 is a more complete line of equally ight component weight, high quality equipment designed to neet and exceed best airline standards, yet especially suited o the business type operation. 560 channel reception, 360 hannel transmission .05 mc spaced. Remote control is ptional in which case receiver and transmitter circuitry are lso rack-mounted. As soon as any element is mounted, the ystem is wired for an entire installation, as the initial harness ontains all necessary circuits, eliminating octopus-like rowths.

The complete system includes all the associated power upply and amplifier modules, converter, glide slope and narker beacon receiver. OMNI/LOC, OBS and GP plus eparate flag alarms are combined in the 4087 Indicator. Lear offers also the Model 5522 Audio Isolation and Speaker Amplifier and a Dual Controller to handle duplicate instalations with automatic switching.

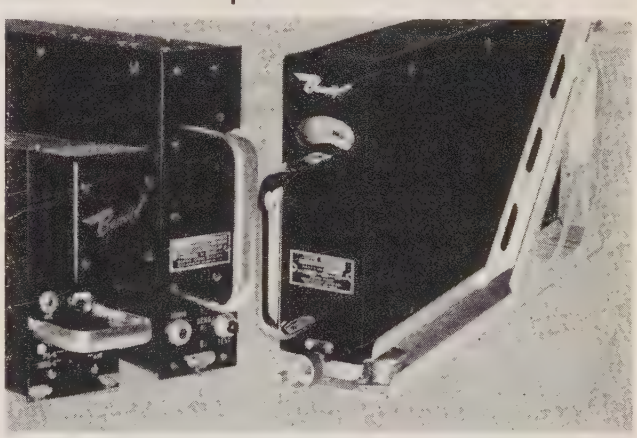
In the LNC-200 photo, note Lear's "No-Numbers" ADF indicator working off the latest Goniometer loop. Often the main source of ADF trouble, the old-fashioned rotating loop and housing has been a catch-basin for water and dirt accumulation and an abomination on the fast, clean lines of any airplane. The Gonio is virtually flush (1" thick), nonrotating, cuts drag and weight, gives better reception and is adaptable to *any* ADF system, enabling immediate replacement of out-moded systems in all business aircraft.



Of possibly greater importance is the announcement that Lear is establishing a group of factory service-coordinating centers to back up their dealer-distributors. Many of the shops in these latter organizations cannot afford to concentrate exclusively on knotty maintenance problems of individual makes without passing the added costs on in figures that often antagonize the customer against both the shop and the manufacturer. Lear specialists will ease this burden and create a more favorable atmosphere for both the dealer and the independent service outlet.

Lear field service facilities are being stocked with exchange equipment which will be used to speed transient customers on their way without delay in the event any unit of Lear equipment has to be removed for service. Along with this "no-down-time" policy, Lear is extending their one-year warranty to the customer via a second year optional warranty plan. All of this should go a long way toward endearing the consumer to a producer who is apparently unusually sensitive to the equipment headaches of customer. dealer and serviceman alike. **Circle No. 43 on Reader Service Card**

Bendix Aviation Corporation Radio Division



Early fall delivery is now promised by Bendix on their 21 Series "lightweight" communications and navigation equipment. Designed especially to encompass the wide range of virtually all multi-engine aircraft, it is expected to find favorable response from operators of business aircraft ranging in size from the light-twins on up. Under development since 1956 and first announced a year ago, the equipment features transistorization and printed wiring as well as printed circuit techniques. Built to ARINC specs, the "21" series represents a 50% saving in weight and space over previous Bendix quality equipments. The complete new line includes the TA-21A VHF Transmitter, RA-21A VHF Receiver, NVA-21A Navigation Unit, GSA-8A Glide Slope Receiver, MKA-7A Marker Receiver, and AMA-10A PA Amplifier. The first three units are all short ⅜ ATR and weigh 14 lbs, 8 lbs and 9¼ lbs respectively. 360 channel transmis-

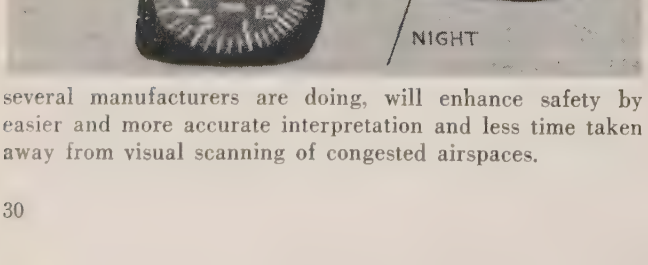
sion, 50kc spacing at 25 watts should be extremely effective in high density enroute and terminal use. The 560 channel receiver and navigational unit combine to provide complete communications. VOR/LOC manual and automatic instrumentation. Bendix recently captured a half million dollar contract for radar and radio equipment to be used by CAA in airways checking. **Circle No. 44 on Reader Service Card**

Collins Radio Company

When Collins announced last year their "airline standards" 17L-8 VHF Transmitter, the reaction was instantaneous. The name alone carried a promise of quality communications crammed into an instrument size package. Especially suited to meet the need for multi-channel air-ground communications, it wetted the appetite for the remainder of the package whether to be used as dual-nav equipment or original installation. As of now, Collins offers the 17L-8A, providing 90 channels 100kc spaced at a power output of 3 watts, the 51X VHF Receiver—190 channels 100kc spaced which will provide VOR and Localizer when used with the Collins Omni-Converters (note the prominent, handy Squelch location) and the 344D-1 Omni-Converter Indicator which combines the VOR/LOC, TO-FROM indicators and the Course Selector in one standard size instrument. All operate from the Collins 427B Power Supply and total weight is below that of comparable equipment of similar standard. **Circle No. 45 on Reader Service Card**

Pioneer Central Div. of Bendix Corp.

The search for better instrumentation so vital to safer operation in today's increasingly complex flight operations cannot wait on development of pictorial representation techniques to filter down from the first military applications to the general aviation field. Our present instruments are going to be with us for a long time and any improvement as

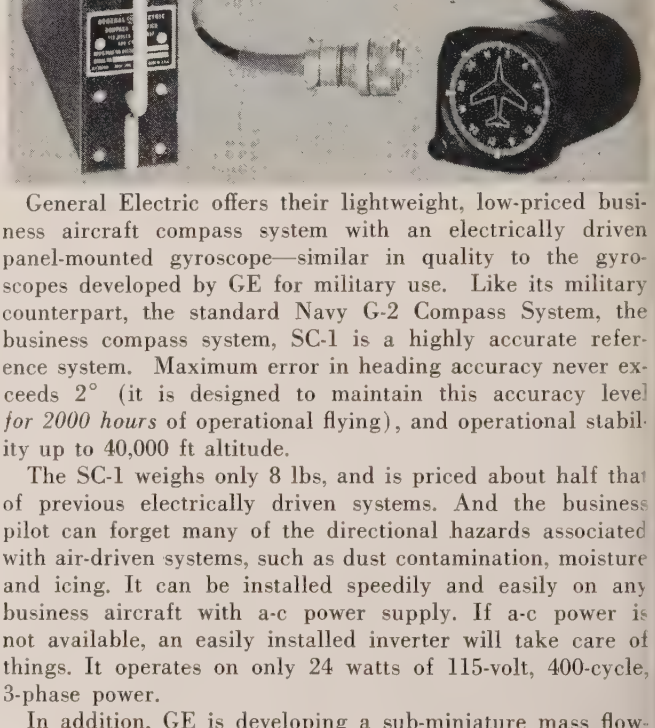


several manufacturers are doing, will enhance safety by easier and more accurate interpretation and less time taken away from visual scanning of congested airspaces.

During recent months, Pioneer-Central has concentrated on developing and producing lighted flight instruments particularly suited to the business flying market. Turn and Bank, Vertical Velocity and Airspeed Indicators are available in either clamp-on or bezel mounting 2″ or 3″ size and operate off 5 or 28 volt systems. The Turn and Bank is available as either an air-driven or electric model, the latter containing a power failure indicator. Outstanding is the novel lighting arrangement which provides easily read white letters and graduations by day and a red presentation at night when dark adaption is a must.

Circle No. 46 on Reader Service Card

General Electric Company



General Electric offers their lightweight, low-priced business aircraft compass system with an electrically driven panel-mounted gyroscope—similar in quality to the gyroscopes developed by GE for military use. Like its military counterpart, the standard Navy G-2 Compass System, the business compass system, SC-1 is a highly accurate reference system. Maximum error in heading accuracy never exceeds 2° (it is designed to maintain this accuracy level *for 2000 hours* of operational flying), and operational stability up to 40,000 ft altitude.

The SC-1 weighs only 8 lbs, and is priced about half that of previous electrically driven systems. And the business pilot can forget many of the directional hazards associated with air-driven systems, such as dust contamination, moisture and icing. It can be installed speedily and easily on any business aircraft with a-c power supply. If a-c power is not available, an easily installed inverter will take care of things. It operates on only 24 watts of 115-volt, 400-cycle, 3-phase power.

In addition, GE is developing a sub-miniature mass flowmeter system for small turboprop, turboshaft and reciprocating-engine business aircraft. This will provide more effective utilization of fuel and maximum range in such aircraft as it has done for larger military and commercial aircraft for years. **Circle No. 47 on Reader Service Card**

Springer Aircraft Radio Corporation

As a pilot accumulates equipment to keep ahead of the ever-increasing demand for more electronics, he is frequently confronted with a perplexing situation. He may want to expand or up-date already installed equipment but to do so, must virtually discard the good with the bad or out-dated portions. Modification or component replacement can often provide the improvement sought at a lower cost, and an earlier date than otherwise.

Springer Radio has taken the position that even in aviation radio design, you cannot "be all things to all men". He has concentrated on producing the highest quality of navigational communication and navigation designed to fit and take advantage of existing systems such as ARC's familiar and long-established VHF tunable receiver. The Springer 180

places both the receiver and the speaker amplifier with 0 channel crystal controlled receiving and the audio out- it is over 4 watts so that the speaker amplifier is not eded. Weight is thus unchanged. Rack size is standard ort ½ ATR and an air filter forced ventilation system as- res constant temperature control, vital to accurate, drift- e operation.

Omni signal output is of the correct level and phase to erate a standard ARC converter unmodified.

Circle No. 48 on Reader Service Card

erry Gyroscope Company

The ideal in instrumentation is not defined by any one inciple such as legibility or size of markings, type of light- g, type of information presentation, etc. Like in other en- neering design problems for human interpretation and use, is a matter of compromise held to a minimum to attain a aximum of desired result.

Sperry Gyroscope has come as close to this goal as is cur- ntly possible in achieving absolute uniformity in lighting d controlled brightness ratios in their latest flight instru- nts. The system—with as many as 10 lamps within the al of a single instrument—glows a rich "aviation red", for fe night vision outside of the cockpit. Four distinct meth- s of lighting are used simultaneously:

1. Wedge lighting—for even, non-glare distribution.
2. Back lighting—to illuminate etched face markings.
3. Flood lighting—direct highlighting of specific areas.

4. Pipe lighting—plastic-carried into difficult areas.

Daylight glare and reflections are reduced by coating the glass with magnesium fluoride—camera technique. Permanent red filters eliminate need for colored lamps.

The instruments, part of Sperry's Integrated Flight System, are the HZ-3 Horizon Flight Director, the R-1 Pictorial Deviation Indicator and the C-6 Gyrosyn Compass Master Indicator. The computer and other elements combine in the overall weight of the system of less than 30 lbs.

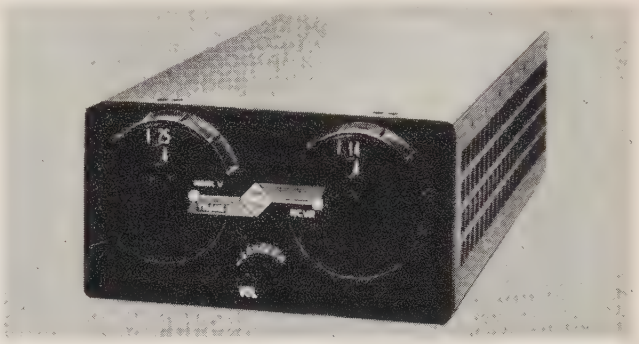
Circle No. 49 on Reader Service Card

National Aeronautical Corporation

Concurrent with the changeover in general aviation from emphasis on personal pleasure to personal business, the standards for navigational and communications radio have also changed. The pressure of high density airways, terminal areas, weather interruptions et al, have created a demand for airborne equipment to enable the non-professional businessman pilot to cope with professional operational problems.

NARCO started early after WWII to design for this market and although not ignoring the higher-priced professional market, they have built their reputation on low-cost, lightweight efficient equipment.

The new Mark V communications unit provides 90 chan-



nel, 100 kc spacing transmission with 190 channel crystal-controlled receiving over the entire present civil VHF range for navigation and communications. It does it with 5 watts power provided by the separate transistor-toroid power supply at a weight of 9½ lbs. Probably the lowest cost such equipment available today, such professional features as concentric frequency selector controls, panel-mounted squelch control should find a happy consumer response. Crystal tuning of the navigational components associated with the desired indicator-course selector (CS-3A or CS-5) eliminates much of the concern of improper tuning during arduous flight conditions, a safety feature in itself.

Circle No. 50 on Reader Service Card

Unique Electronics Exchange Program Announced by Sperry

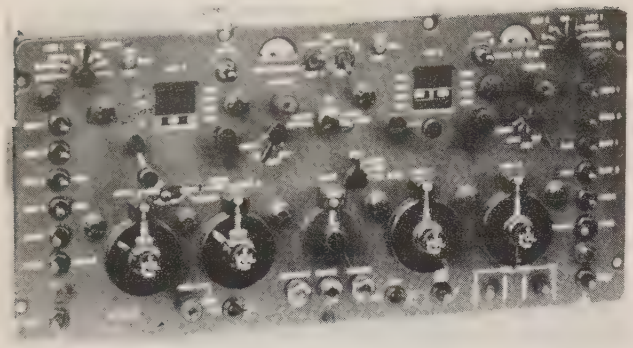
One of the greatest advantages of the aircarriers in the maintenance of uninterrupted operating electronic airborne equipment has been their ability to stockpile partial and complete units for quick replacement as the need arises. In-flight failures are rarely followed by long and crippling down-times on their aircraft. To the business pilot, this is an entirely different picture. Few companies are large enough to afford the off-shelf replacement facilities and rely on service outlets and repair stations.

A new program, called SPEX—for Sperry Exchange—offers rapid delivery at fixed prices of replacements for Sperry flight control, instrument, compass, engine analyzer and other airborne equipment.

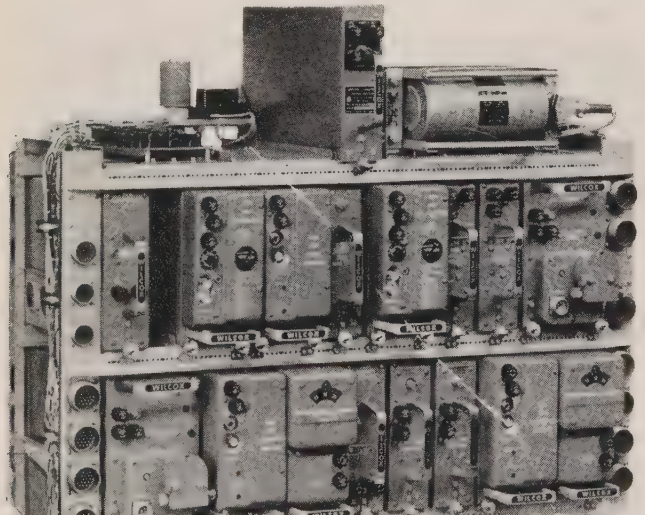
Spex enables users to exchange equipment at any of the company's field engineering division facilities throughout the country. The replacement becomes the property of the customer, eliminating routine service or repair delays.

Circle No. 51 on Reader Service Card

Wilcox Electric Company



Of outstanding significance in the airborne electronics field has been the "package concept" pioneered by Wilcox Electric, in which airline standard navigation and communications equipments have been engineered into an integrated complete installation, tailored for use in a specific aircraft. The engineering techniques employed have resulted in both weight and space saving advances. This has permitted even the medium business twins to enjoy the advantages of complete dualization commonly associated with airline operation, and also meeting ARINC specs. The photo shows a typical system for a medium-sized business twin. Similar systems are available for such aircraft as the Aero Commanders, all Beech twins, Convairs and other popular business aircraft, including the new Fairchild F-27 ordered by quite a few companies.



Wilcox is also the national distributor for the General Electric light-weight automatic compass system.

Circle No. 52 on Reader Service Card

AMB Air Activity Survey Gets New Approach

The most comprehensive and detailed survey of aviation activity ever conducted in this country will be handled by Booz, Allen and Hamilton, management consultant firm of Chicago.

A detailed analysis of traffic in the three major classifications of aviation activity—military, air carrier, and general aviation, is vitally needed by the AMB's Operations Analysis Directorate as a yardstick by which to gauge selection and capacity of equipment that will go into the new airways system. The information will also be used to determine capacity and distribution of airports.

Another and equally important purpose of the survey is the development of a valid method of forecasting future air traffic. Any system selected for national use must be capable of growing to handle future traffic as well as solving the traffic control problems of today.

The tentative plan calls for sub-dividing the entire country into hexagonal "cells," each measuring about 75 miles from center to any side. This type of division will insure that every square mile of area in the country will be included in the survey. The method employing circles as divisional units was discarded because of the gaps that would result. The 75-mile radius was selected because that is the maximum reliable range for VHF radar, communication and navigation aids at low altitudes.

Three basic "measures" of traffic will be used by the team to insure completeness of the survey;

(1) Air traffic flow between appropriate airports and/or between cells,

(2) Instantaneous airborne traffic over any specified area of the country, and,

(3) Departures and arrivals of aircraft.

A mathematical method, employing high-speed electronic computors, will be devised for computing present and future traffic in terms of the three measures listed above.

Figures will also be prepared indicating variations caused by weather and seasonal factors. Figures for peak-hour or peak-day figures will be broken down to show aircraft types, flight altitudes, speeds, geographical distribution or origins and destinations, local and itinerant flights or departure and arrival times, number on IFR flight, number flying VFR.

General aviation operations data will be arranged for aircraft types such as multi-engine large, multi-engine small, single engine large, single engine small, helicopters, and with a possible breakdown within each category by HP.

Completeness of the survey can be gauged by the estimate-breakdown being used. Estimates will be prepared, in each of the three basic measures, for every hour of a 24-hour day. In addition, separate estimates will be prepared for an average week-day (Monday through Thursday), and for a representative Friday, Saturday and Sunday. Information thus gained will be used as "inputs" to a simulator being built for AMB by the firm of Aircraft Armaments, Inc. of Cockeysville Md. The simulator will be used to feed an elaborate control center mock-up in the AMB's test station at Atlantic City, N. J.

All systems and components developed by AMB will be tested in a simulated environment before undergoing live testing with AMB's fleet of aircraft, and for the first time such analysis will be directly related to air traffic conditions as they actually exist.

Value of the initial contract awarded to the consultant firm by AMB is $342,370, and the project chairman for the survey is Richard H. Seaman, chief of AMB's Traffic and forecasting division.

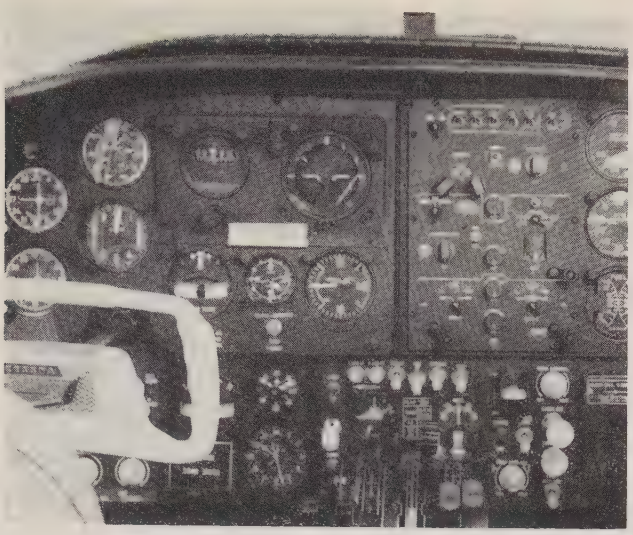
CAA Announces Record Outlay For AirNav and ATC Facilities.

Based on the largest fiscal appropriation to date of $175 million, CAA has announced a program of expansion that will emphasize radar and TACAN. In excess of $54 million is slated for more Center and Tower radars, tie-in with military radar, beacons and taxi-control radar. $2.5 million will go into new airport towers where need exists, $5 million into new ILS and TVOR's.

The largest single chunk $58,660,000 is earmarked for new TACAN installations at existing VOR sites and new VORTAC facilities. The balance is presumably accounted for by operational, maintenance and administrative costs of existing organization and facilities.

P.S.—CAA needs civil DME airborne equipments for its Flight Inspection work. Contact Chief, Procurement Division, Wash. 5, D.C., if you can spare yours!

Aircraft Radio Corporation—



ARC must feel something like the parents who arrive unheralded at a summer camp to find their offspring the proud recipient of some camp honor. The Best of Class, light twin, for Equipment and Instruments at Reading, Pa., was N.Y. Wire Cloth's Cessna 310; prominently placed in the very middle of the prize-winning instrument panel was ARC's latest, the C-77A radio control panel. (See illustration)

Custom-designed to provide fullest utility of navigation and communication for all-around weather operation, the C-77A as installed in the 310 measures 7½ in. by 10 in. Smaller panel arrangements are available for other aircraft type installations. All exceed TSO requirements.

The system includes a primary communications system utilizing ARC's type 210 360-channel 50 kc spaced transceiver covering 118.0-135.95 mc, DCS or SCS, assuring complete coverage for years to come. Backing this unit is a Type 20/22 20-channel transmitter, ample to supply dual-safety coverage on all common-calling and emergency channels thruout the 116-148 mc band.

Again designed for modern practical airway requirements is the Dual Omni capability. Omni #1 is geared to ARC's CD-1 Course Director for ease of navigation and tight low approaches; the Omni #2 is designed to tie in with the Type 20/22 transmitter to provide a second communications setup; plus Localizer capability.

Glide slope selection has a separate control knob and the VHF Marker receiver gives both audio and visual indications.

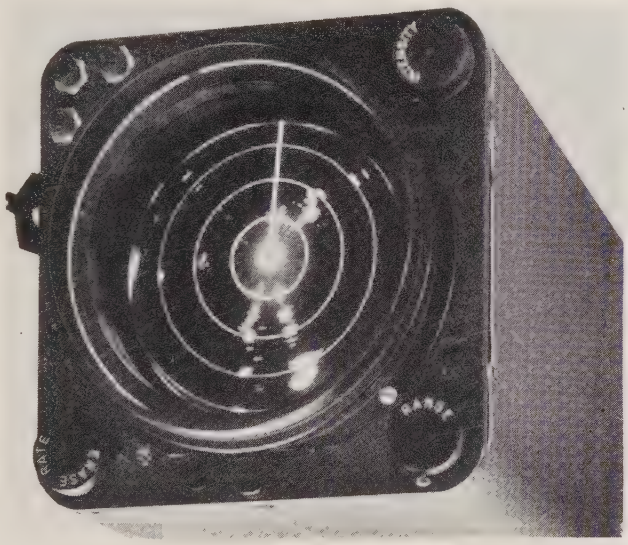
Of special interest is the convenient built-in facility selection switch row at the top of the panel whereby the pilot can make his receiver audio selection without readjusting the individual volume controls or ON-OFF switches.

A Type 21A ADF is included in the system, and automatic or manual control by a spring-loaded switch is featured.

Such extra refinements as the Press-to-Whistle tuning, the squelch circuit control on the Omni #2 function selector knob, the SCS-DCS pairing selector on the primary transceiver and the marker receiver sensitivity switch mark this a full scale "big ship" professional rig to go in any business aircraft from a light-twin up.

Circle No. 53 on Reader Service Card

Radio Corporation of America—



It is hoped that RCA's display at the NBAA Meeting and Forum at Philadelphia will feature an operating DST (Display Storage Tube) indicator for use with RCA's AVQ-10 Weather Radar System. This indicator is capable of actual operation unhooded in bright sunlight.

Present airborne weather radar systems use a standard PPI indicator which requires use of a hood to interpret the display in high ambient light conditions. In the case of some aircraft, two indicators are required in order to allow both crew members to view same independently without much body twisting or ducking; others use a single indicator in the center of the instrument panel and a long hood that swivels to provide alternate viewing by either pilot. This, of course, means that whoever is viewing the radar must devote his entire attention to the hood and cannot perform other cockpit duties or assist in a safety watch outside of the aircraft.

With the RCA DST indicator installed in the center of the instrument panel, either or both crew members can view the scope without the need for a hood, even in such conditions as bright sunlight (as when in the clear VFR but approaching a thunderstorm front, for instance). The performance of other cockpit duties including traffic surveillance is unaffected and safety enhanced.

The culmination of two years development, RCA expects first deliveries to airlines and business aircraft operators during the fall of this year.

Circle No. 54 on Reader Service Card

Automation is GOOD Business

by Joe Bush

William Piper, Sr., is noted not only as one of the deans of personal aviation but also for his philosophical approach to the airplane market. After WW II, when it began to be evident that the tricycle gear was one key to the opening up of the personal business plane market, Piper lost no time in dropping the conventional gear except for trainers and special use aircraft.

Next, the value of offering a fully-equipped "package" airplane ready to do a businesslike job was fully appreciated and acted on with most Piper products offered with complete VHF navcomm radio for efficient cross-country flight.

Nor was it overlooked when sales figures pointed the fact that, despite offering the lowest priced line available, purchase demand centered on the deluxe models. As Howard Piper put it "when *we think* it is something *everyone should have*, we have found little difficulty in selling it!"

The latest and best example of this sales philosophy is the announcement that Piper will offer a complete line of aircraft fully equipped including an automatic flight system designed to provide ease of professional flight with dividends of safety built-in. For some years, Piper has been mulling over the idea even while responding to occasional customer demands for autopilot equipment designed as accessory equipment. After carefully examining

all available full and partial systems, it was decided that aircraft design had amply attended to the problems of pitch and yaw. It was decided further, that if the roll axis were controlled, truly stabilized flight could be had at a cost in money and current drain far below comparable systems.

Here again the Piper philosophy asserted itself. Having decided that the Mitchell Industries (Mineral Wells, Tex.) system met their requirements best, an arrangement was made to supply only those components necessary to offer the customer the irreducible minimum that Piper felt he *should* have and leave any augmentation up to him. At a cost of about $750, it seems likely that many customers will conclude that Piper has indeed given them the maximum for the least outlay.

Weighing only 4½ lbs. the Auto-Control is completely transistorized and uses less than ½ amps. The unit takes its information from both a modified Directional Gyro and the Artificial Horizon, and concerns itself principally with keeping the wings level.

A single knob turns on the Auto Control and engages it. Turns are made by a small knob (see photo Aug. pg. 23) adjacent to the DG which will produce up to 3°/sec turns. Concentric with this knob is a trim control knob to make desired compensations for wing heaviness, fuel management, etc.

To hold any desired course, the DG is set at zero and the turn knob pulled out. This engages the heading lock feature and will hold the airplane precisely to the heading desired. The control will follow the DG within a tolerance of 1° and precession at the zero setting is virtually non-existent. Conceding that the purpose of this instrument is to ease and safeguard primarily non-professional flying, limiting the heading lock to the zero setting is not the shortcoming that it will first appear to professionals accustomed to the more sophisticated, but much more expensive, complete autopilots.

This limitation does not prevent the AutoControl from doing a very vital and important life-saving job for the many newly arrived personal business pilots on whom the industry may well rely for its strength in years to come. In the unhappy event of a VFR pilot encountering unexpected instrument conditions enroute, he has merely to turn the DG setting knob to 180° (actually 170°) and the AutoControl will bring him around in the most heartwarming manner to that desired course. If it were not desired to retain the familiar gyro-stabilized heading information for ordinary DG use, it would almost have been suited to inscribe the gyro card "Destination" instead of Zero degrees and "VFR" in lieu of the 180° markings.

Incidentally, although Piper and CAA recommend not using the Auto-Control below 200 feet altitude in take-off or landing, the very moderate resistance to manually overpowering the system is a quick and adequate reminder that it is engaged.

We couldn't help but feel that in providing this type of comfortable assistance to personal business flying, Piper may well be right in gambling that human nature will assert itself and few future personal plane buyers will consider buying a plane that requires the old-fashioned kind of cockpit concentration. Freedom to enjoy the flight, attend to necessary navigational and radio chores and to maintain an adequate surveillance for other aircraft—all this at a price of 5-10% of the basic airplane will be too good a package to back away from. Piper will call this the AutoFlite line and probably will not be at all unhappy if history repeats itself and he ends up selling entirely this line.

FCC Amends Transmitter Card Rules

As a result of NBAA and ARINC opposition, the FCC has revised a proposed ruling that would have made prominent cockpit/cabin display of the radio transmitter license card a mandatory requirement in all aircraft.

Part 9.118 (b), FCC Rules: "The current authorization for an aircraft radio station shall be posted prominently in the aircraft or shall be kept with the aircraft registration certificate."

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at the NBAA Show
Complete Kits...
Ready to Install!
NEW
D-18 ENGINE MODERNIZATION KIT for increased power, quieter performance. Features: Automatic Oil Regulator & Cooler • 3-Blade Propellers • Modified Carburetor Air Scoop System • Nose Case Fairing • Cowl Liner
NEW
AVQ-50 RADOME KITS for Beechcraft Model 50, D-18 & E-18 • Aero Commander • Lodestar
NEW
"PAGAN" D-18 MODERNIZATION KITS. Full-Contour Main Gear Doors • Full-Contour Tail Gear Doors • Fiberglas Air-Step Door • Full-Vue Picture Windows • Modernized Fiberglas Nose Bowl • Auxiliary Wing Fuel Tank System
See these new kits on display at the NBAA Show—Sept. 22 thru 26, Bellevue Stratford Hotel, Philadelphia, Pa.—Booths 43-44-45 or write for full details.
1669-A
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Test your cross-country memory

Can you name this airport?

Clue: *the citrus fruit center it serves is the spring training site of the Washington Senators baseball team.* (*Answer below*)

Now test your aviation oil memory: Do you remember the two important reasons why Gulf oils are better for your engine?

1. In addition to providing efficient, thorough lubrication, Gulf aviation oils help keep engines *clean*—and safe!

2. Gulf-clean engines can go longer between overhauls, because there's less wear and tear on engine parts.

Choose either new Gulfpride Aviation Oil Series D, the detergent oil, or Gulf Aircraft Engine Oil, the straight mineral oil—both keep your engine Gulf-clean and safe.

The airport pictured above is the Orlando, Florida Municipal Airport, two-and-half miles east of the city. It has five paved runways, the longest of these being 5,500 feet.

Here you'll find friendly Gulf service under the supervision of Howard Showalter, president of Showalter Flying Service.

GULF

AVIATION PRODUCTS

Fly safely with a Gulf-clean engine

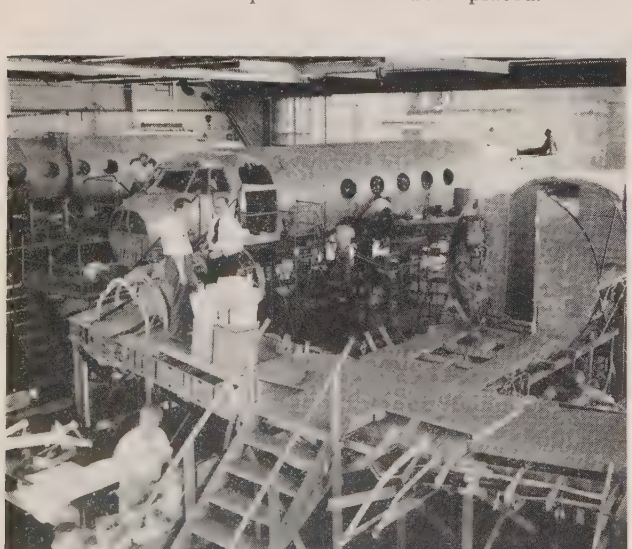
GRUMMAN GULFSTREAM

Few persons are privileged to sit in on the development stages of a new and important aircraft design. Skyways takes its readers on a short, intimate photo-tour of some of the production engineering steps of the past months at Grumman's Bethpage, Long Island plant.

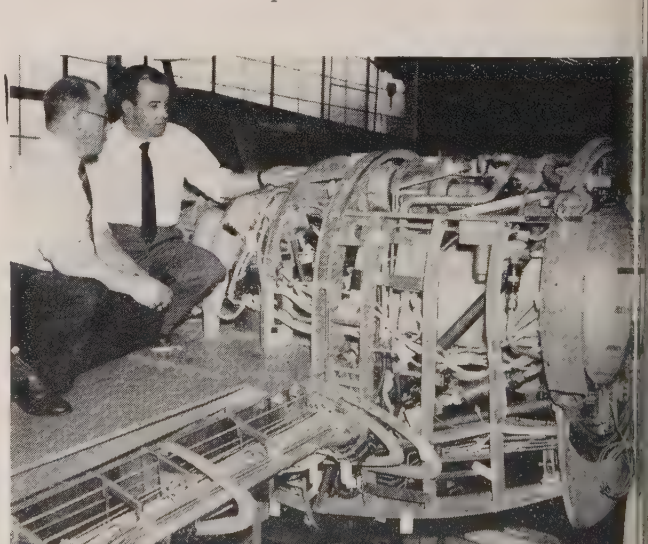
The Gulfstream made its maiden flight last month, the 2105 ESHP Darts purring, and the industry will be looking for it at NBAA's Meeting and Forum in Philadelphia this month. The 10-12 passenger plane is expected to cruise at 350 mph at 25,000 feet. Maximum gross operation from sea level runways under 4,000 feet long and range of more than 2,000 miles is promised the business user. As of last month, over 27 orders from corporations have been placed.

Although Grumman will provide all necessary demonstrations, nationwide sales will be handled by Atlantic Aviation Corporation, Pacific Airmotive Corporation and Southwest Airmotive. In Canada, sales outlet will be Timmins Aircraft, Ltd., at Montreal.

Of special interest is the package delivery combine developed by Southwest Airmotive. Grumman will deliver the airplane unfitted, and Associated Radio, Inc., of Dallas, and Horton & Horton, Fort Worth, will fit out the aircraft as specified by Southwest's customer. Southwest Airmotive has been tooled up for some time on military turbojets, so service and maintenance will be no problem to their customers. service facilities are in operation nationwide.



Seen here is the Engineering Systems Mock-up. Electrical, hydraulic and other operating systems of the aircraft are laid out and checked through to eliminate costly, delaying snags later on in the airframe stages of the prototypes and production models #1 and #2 (in background) will be used in extensive CAA flight certification testing.



Rolls Royce and Rotol representatives check-out an item on the systems mock-up. Powerplants are RR Darts with new-design Rotol turbo-propellers. Based on airline experience, OH time on the Darts is about 1500 hrs. Potential power growth of the engine is tremendous, permitting an almost unlimited utilization of the basic airframe.

Wing span for the Gulfstream is 78 ft, 6 in, over-all length s 64 ft and maximum height is 22 ft, 9 in. Takeoff gross weight is 31,000 lbs., and a normal range fuel weight is 3,800 lbs. (Extended range fuel weight is 10,000 lbs—all fuel carried in wings outboard of the fuselage.)

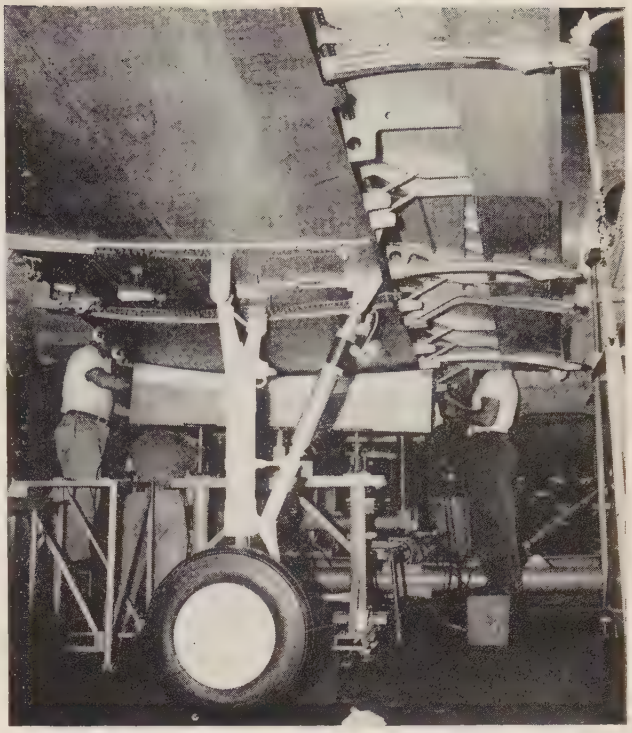
Pressurized, the Gulfstream has a twin-engine service ceiling of 36,000 feet and 17,000 feet, single-engine. Cabin altitude is 5,500 feet at the planned cruising altitude of 25,000 feet. Chordwise high pressure de-icing boots are standard equipment.

All the latest features on "fail-safe" design structure have been incorporated into the new airplane. Fuselage design incorporates a multi-element "fail-safe" feature permitting individual failure of any single component part without group structural failure eliminating any possibility of airframe destruction as a result of inadvertent uncontrolled depressurization of the fuselage. Operating stresses in the skins of the pressure "vessel" are very low. The airplane is designed for a structural fatigue life of 25 years.

Both number one and number two production models of the Gulfstream will be put through a vigorous series of flight tests to obtain certification under CAR category 4b, latest transport requirements. It is estimated now that the first airplane will be delivered, following completion of the test program, sometime in early 1959. With the successful initial flight, the delivery date estimate appears good at this time.

A few random details will be of great interest to executive crews looking forward to meeting today's difficult operating conditions in regular use. Grumman has made ample provision for more than minimum radio communications and navigation equipment both spacewise and weightwise, allowing approximately 730 lbs in the all-up gross weight figure for this equipment plus the most complete autopilot installation. From the start, the cockpit is a working pilot's dream. There should be no STC fixes in this one.

Takeoff on a scorching hot day (113°F) at 31,000 lbs in 2,390 feet at sea level using water methanol ices the cake!

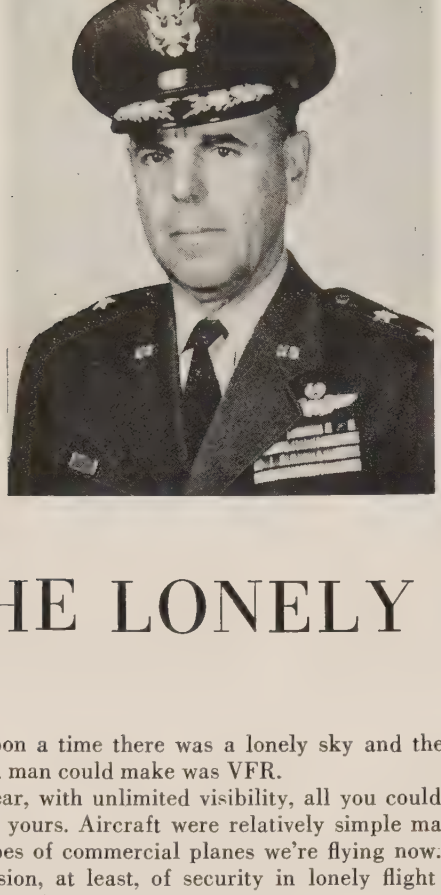


Flap position and main gear are shown on one of the first models. Large flaps and sturdy gear help the Gulfstream to exceed high angle approach and landing requirements of CAR, landing over a 50-foot obstacle and stopping in 1,355 feet at sea level without the use of the non-skid braking system and with one engine out.

The wingbox beam integral fuel tank, made of four integrally stiffened machined planks on upper and lower covers, permits failure of any one element without catastrophic failure of the wing. Favorable remarks followed the first flight indicating performance is up to expectations.

The finished product weighs in. Spectacularly marking Grumman's return to the commercial aircraft market, the Gulfstream is virtually self-sustaining. It will carry its own source of auxiliary power—an AiResearch small gas turbine —to start main engines and provide comfortable weather and climate-free air conditioning on the ground. In-flight pressurization and air conditioning are also by AiResearch. Cabin altitude of 5,500 ft at 25,000 ft is promised.

Circle No. 40 on Reader Service Card



Assigned in 1955 as Director of Flight Safety Research, Office of The Inspector General, USAF, Norton Air Force Base, Calif., Maj. Gen. Joseph D. "Smokey" Caldara directs aircraft accident prevention activities throughout the U. S. Air Force.

He graduated from Kelly Field in October, 1932. During World War II, he was in the South Pacific Theater as Chief of Air Operations, Headquarters U.S. Army Forces; Plans Division, Headquarters Army Air Force; Chief of Staff, Alaskan Air Command and Emergency War Planning on the Joint Chiefs of Staff.

From 1952 to 1955, served with Strategic Air Command as a Commander in Puerto Rico, Kansas, Japan and Guam.

THE LONELY SKY /

by Major General Joseph D. Caldara, USAF
Director, Flight Safety Research

Once upon a time there was a lonely sky and the safest flight a man could make was VFR.

In the clear, with unlimited visibility, all you could see of the sky was yours. Aircraft were relatively simple machines, the prototypes of commercial planes we're flying now. There was an illusion, at least, of security in lonely flight in the good old days of ten or fifteen years ago.

But the good old days are gone and often enough today you're safer on instruments in weather than when you're flying VFR. Because the skies are crowded now and the biggest bogey of them all is apt to play havoc with the most carefully planned flight, another aircraft on collision course with yours.

Air traffic will be rigidly controlled in time and some of the problems pilots face today will disappear. But the basic problem of flight safety will remain with man as long as he continues to fly, no matter at what speed or altitude, no matter in what kind of aircraft. That is the problem presented by man himself, his innate tendency to make mistakes, his inability to outperform his own machines.

It is true that in keeping the statistical record of aircraft accidents, we break them down into a group of arbitrarily separated causative factors. We may say a given accident results from material failure, design deficiency, weather, and so on, but the fact remains that the biggest category is always pilot error. This is so because the basic cause of every accident is always the same, the human factor, the error of someone involved in the complex and interwoven business of designing and building planes, in their repair and maintenance of flight. This will in one way or another continue to account for every aircraft accident we'll ever have. And it is the only reason there is for every precautionary measure taken by any organization or individual to make flight safe.

The obvious fact that human beings make mistakes is the fundamental *why* of any plan or program for safety in the air because it is the primary cause of every aircraft accident. The pilot of even a small and relatively slow conventional aircraft can no longer really trust himself, if he ever really could. The pilot who thinks he can always rely on his skill alone is headed for trouble. So is the overconfident mechanic or engineer or specialist in any other field related to the pilot's flight. All their confidence will do for the pilot is hurry trouble along.

That is why flying safety has largely become a matter of accident prevention. We speak today of preventive maintenance, of designing for safety and of enforcing discipline all down the line because we know from some really bitter experience that our primary job is to make everyone who may be in any way responsible for any aspect of flight aware of his own tendency to err—to design a component that in a given attitude of flight won't work, to install a replacement part that can't function as it should, to release a plane that shouldn't be flown or to plan a flight that can't be made.

The fact that we all may err is a burden we share together. For the pilot the penalty is greater than for the man who works down on the ground. At Mach 1 the penalty comes a little more rapidly than it does at two or three hundred miles an hour. But the penalty is always the same, a hole in the ground and a telegram to the next of kin.

And if the penalty is always the same, so is the cause. No matter what he's flying or how he goes in, the pilot who's clobbered is clobbered by *human error*, his own or an error committed by somebody else along that living line that runs from the drawing board down through the industrial plant and airport or base facilities to that hole in the ground.

Planning has therefore become the inevitable co-pilot on every flight, just as prevention has become the key word on the ground. The pilot who does not foresee *an alternative to every choice he might be called upon to make* and who doesn't plan for every eventuality that might catch him short of his destination is as guilty as the mechanic who thoughtlessly inverts a pump or carefully fuels a jet with 100 octane gas. So is the engineer who designs an instrument that can't be read when the pilot needs it most. But it's the pilot who pays, along with his passengers, for everybody's fault. He pays unless he has alerted himself against himself. He must be aware of his own tendency to err, and he must *always be prepared* to inherit the net result of somebody else's mistake. Because flight in even the simplest conventional aircraft today is a complex affair demanding all the caution, planning, skill and judgment we can bring to it.

Our growing awareness of this fact has ushered in a new air age, an age not of the old unlicensed individual freedom to roam the sky and touch the face of God, but an age of licensed liberty to fly within airways, within the framework

(Continued on page 79)

MORE "BARK" THAN "BITE"

in this front . . .

with RCA's new WEATHER RADAR in your plane!

When the weather looks like this, the old rule book says "go around." But not when you have RCA's AVQ-50 in your business or executive aircraft. Its scope will point out to you, night or day, or in IFR conditions, non-turbulent paths through or between storm areas that may save time-wasting, costly detours and give you and your traveling companions a smoother, more comfortable ride.

In addition to giving you this "look-see" into the weather as far as 80 miles ahead, the AVQ-50 provides ground-mapping information. Because of its lightness, efficiency and dependability, the AVQ-50 is being specified as standard equipment by operators of executive aircraft where weight, space and power are at a premium.

For further information address . . .

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190 CHANNEL VHF RECEIVER
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POWER SUPPLY—MODULATOR—AMPLIFIER
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- BUILDING BLOCK ADD-ABILITY
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Add the new Lear TSO'd glideslope receiver including VOR/ILS indicator complete for ***$795***

CANADIAN REPORTS

North of the Border
By R. J. Childerhose

Non Sked Services Regs Change

In a House of Commons exchange, Transport Minister George Hees indicated that the government is planning to modify somewhat the regulation of non-scheduled services in Canada involving the use of light aircraft. Said Hees:

"The government has come to the conclusion that there should be an easing in the treatment of applications for licences for non-scheduled commercial air services which involve only the use of light aircraft and helicopters.

"Services of this type can only offer transportation at a relatively high unit cost compared with larger aircraft. In total they provide only a small percentage of the air transportation picture in Canada. The government has accordingly decided that it would be in the public interest that licences for air services using only light aircraft be granted freely on request.

"Generally speaking, this policy will apply to group C aircraft, that is, single-engine aircraft having a gross disposable load of less than 1,100 lbs and to small single-engine helicopters such as the Bell 47 and Sikorsky S-51 types.

Traffic Figures Up

The Department recently announced that air traffic for the month of June, in terms of the number of landings and takeoffs, increased by 15.3% over the same period a year ago. The report covers the 27 airports across Canada at which the DoT operates the control towers. The June figure of 287,937 arrivals and departures compared with 249,700 for June, 1957.

Busiest airport in the Dominion was Vancouver with 31,549 followed by Ottawa with 26,295; and Montreal 26,234. Scheduled airline takeoffs and landings saw Montreal leading with 5,214 followed by Toronto, Vancouver, Edmonton, and Winnipeg, in that order.

Flying Clubs To Move

The Department of Transport is studying the possibility of co-operating with flying clubs in establishing small satellite airports for their use. The move would relieve busier airports across the Dominion which cater largely to civilian air services and the RCAF.

Transport Minister George Hees said that about 1,800 civilian pilots were trained in Canada in 1957 under the federal government's assistance program to flying clubs. This figure is expected to reach 2,000 this year.

When asked about the outlook for setting up a Canadian group of private and business fliers equivalent to the U.S. Civil Air Patrol, Mr. Hees said that such an organization is presently being considered by the Department of National Defence.

SARAH Rescue in BC

Two men whose light aircraft crashed in the wilds of northern British Columbia were rescued short hours after they had gone down. Responsible for their short sojurn in the inhospitable rocks and forest area some 500 miles north of Vancouver was the emergency SARAH transmitter carried in the aircraft as part of its survival pack.

Tom Williamson, a pilot for the Chilcotin Company which operates out of Williams Lake, and Angus McDonald, a Vancouver geologist, were conducting an aerial survey in the Bear Lake area when engine trouble forced them down.

An RCAF Canso aircraft from No. 106 Communications & Rescue Flight at Vancouver's Sea Island Airport was sent out to make the search. By homing in on the SARAH beacon which has an effective range of 80 nautical miles, the Canso located the survivors almost immediately. It is believed that this is the first occasion that SARAH equipment has been responsible for an actual rescue in Canada.

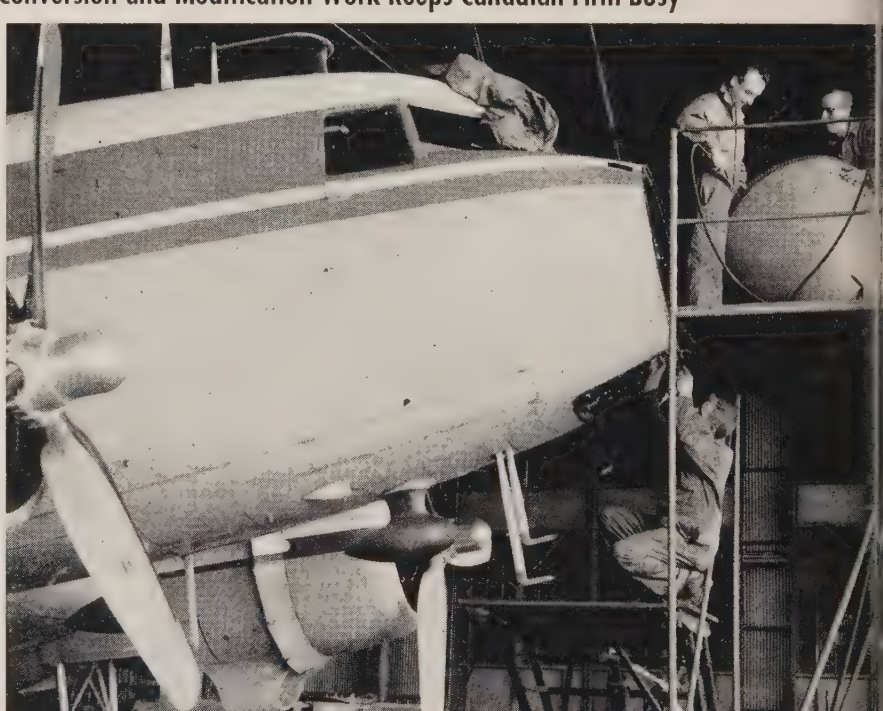
Forest Survey Contract

Capital Air Surveys Ltd., of Ottawa, have been granted a contract for the aerial rephotography of some 12,500 square miles of Ontario's forest areas. The contract was let by the provincial department of lands and forests. The contract extends over a period of ten years and is aimed at making a new inventory of Ontario's forest resources.

Areas to be rephotographed are the heavily wooded parts around the Swastika, North Bay and Pembroke districts. Said lands and forests minister Mapledoram:

"Changes resulting from growth cutting, fire, severe storm damage, and other factors must be recorded regularly by a physical check as afforded by aerial photography and ground sampling."

Conversion and Modification Work Keeps Canadian Firm Busy



DC-3 RADOME INSTALLATION *is typical of the modification work done by Timmins*

Placing emphasis on developing comprehensive maintenance plans that offer the operator maintenance on a close-as-possible flat rate basis, Timmins Aviation Ltd. completed many conversions, modification and overhaul programs for Canadian business aircraft operators during the past year.

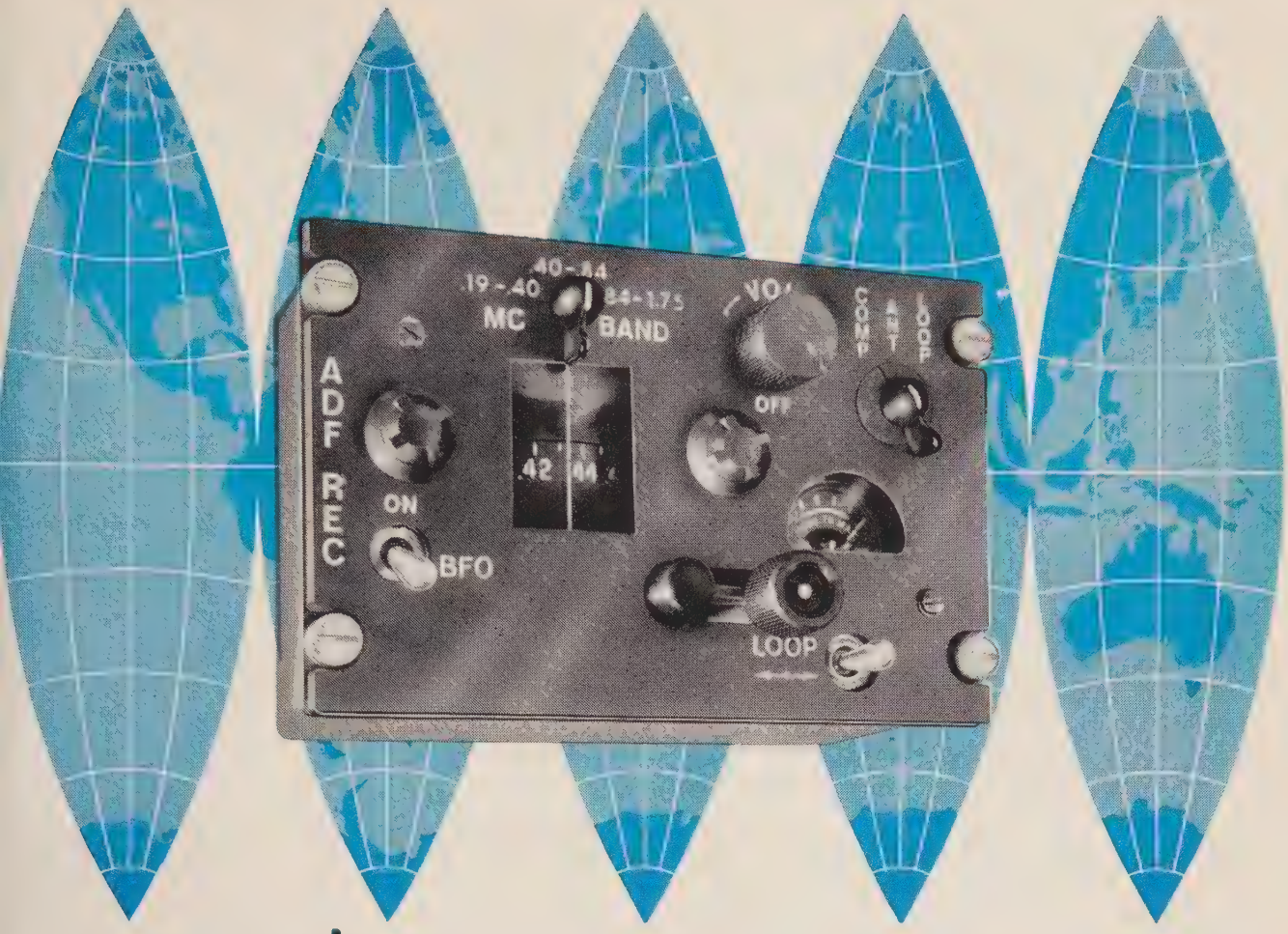
Timmins, at Montreal Airport, established a new subsidiary company, TimCom Engineering Ltd., to completely service the electronic requirements of the business aviation fleet, including navcom flight systems and radar.

A Sales and Aviation Fuel Unit was established at Toronto Malton Airport, and the company has expansion plans for this area.

With the completion of its million dollar cargo and office building, Timmins opened its "Board Room," designed to service the requirements of the flying businessman.

Canadian Business aircraft is destined to play an important role in the future development of our country, even more so than the "bush" aircraft of the past era, says John A. Timmins, president.

Circle No. 41 on Reader Service Card



TYPE 21A ADF WEIGHS ONLY 19.7 POUNDS

Component Unit Weights:

Receiver, 6.8 lbs.; Loop, 4.3 lbs.; Loop Housing, 0.5 lbs.;
Indicator, 1.3 lbs.; Control Unit, 1.6 lbs.; Power Unit, 5.2 lbs.;
CAA Certificate No. 1R4-9 U.S. Military: AN/ARN-59
British Certificate of Approval VC-78

World-Wide navigation aid

The Time Tested ADF Now in Less Weight, Less Space

The ADF is a basic air navigation instrument, used in all parts of the world, turnable to some 60,000 transmitters. But the important thing now about the ADF is that ARC has engineered an ADF system down to less than 20 pounds in weight, with a comparable saving in space.

Now pilots enjoy the advantages of dual installations of this compact miniaturized equipment in tolerable weight and space requirements.

The ARC Type 21A ADF is built to today's more critical speed and environmental demands. It has hermetic sealing of vital components, such as the entire loop assembly. It covers all frequencies from 190 kc to 1750 kc . . . operates on only 2.8 amps at 27.5 volts dc input or equal power at 13.5 volts. A significant feature is the extremely low loop drag—only two inches outside the aircraft skin.

Ask your dealer for detailed literature.

Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation BOONTON, NEW JERSEY

Omni/Loc Receivers • Course Directors
LF Receivers and Loop Direction Finders • UHF and VHF Receivers and Transmitters (5 to 360 channels)
10-Channel Isolation Amplifiers • High Powered Cabin Audio Amplifiers • Interphone Amplifiers • Omnirange Signal Generators and Standard Course Checkers • 900-2100 Mc Signal Generators

Circle No. 42 on Reader Service Card

National Business Aircraft Association, Inc.

11th Annual Meeting and Forum

Philadelphia, Sept. 22, 23, 24

TENTATIVE PROGRAM

SUNDAY, September 21, 1958

REGISTRATION OPENS 12 noon to 6:00 p.m. Bellevue Stratford Hotel. 18th Floor.

MONDAY, September 22

REGISTRATION CONTINUES 8:00 to 7:00 p.m. Bellevue Stratford Hotel, 18th Floor.

8:00 a.m. to 9:00 a.m. **WELCOME QB BREAKFAST**
For visiting Quiet Birdmen and their quests, sponsored by Philadelphia, Wilmington and Trenton QB Hangars; Bellevue Stratford—Clover Room

9:00 a.m. to 6:00 p.m. **EXHIBIT AREA OPENS**
Entire 18th Floor surrounding Rose Garden displaying latest in aircraft, parts, accessories, radios instruments, and services will be open each day of the three-day NBAA meeting.

9:30 a.m. to 10:50 a.m. **ANNUAL MEMBERSHIP BUSINESS MEETING**
Rose Garden, 18th Floor, Bellevue Stratford.

- Treasurer's Report—John H. Winant, Treasurer, NBAA, Sprague Electric Company
- Annual Report of NBAA Activities—Joseph B. Burns, president, NBAA, The Fuller Brush Company
- Election: Members of Board of Directors
- Selection of NBAA 14th Annual Meeting City for 1961
- Discussion Period—NBAA policies and programs—Question and Answer Period.

11:00 a.m. to 12:00 noon **VALUE-PER-MILE**
Presented by the Air Age Education Division, Cessna Aircraft.
Applicable to every type of business aircraft, this revealing and challenging program will provide t business aircraft owner and pilot with definite yardsticks to measure his aircraft's dollar-worth to h business enterprise. (Please refer to page 64)

FREE PERIOD 12:00 noon to 2:00 p.m.

AIRCRAFT ENGINE AND ACCESSORIES SYMPOSIUMS
At each of these symposiums representatives of the engine manufacturers and representatives of firm manufacturing carburetors, magnetos, starters, pumps, generators, spark plugs and propeller governo will give up-to-date information on latest service and maintenance techniques, recommended operation procedures. Brief, clear-cut presentations by authorized company spokesmen will be followed b question and answer periods.

2:00 p.m. to 5:00 p.m. **PRATT AND WHITNEY ENGINES AND ACCESSORIES**
18th Floor Ballroom—Bellevue Stratford, Rose Garden. (Please refer to page 64)
PARTICIPATING—Pratt and Whitney, Stromberg, Scintilla, Pesco-Vickers, Bendix-Utica, Champio Spark Plug, AC Spark Plug, Hamilton-Standard, Delco-Remy, Hartzell, Woodward.

2:00 p.m. to 5:00 p.m. **LYCOMING ENGINES AND ACCESSORIES**
Clover Room—1st Floor. (Please refer to page 64)
PARTICIPATING—Lycoming, Stromberg, Scintilla, Pesco, Thompson, Bendix-Utica, Bendix-Re Bank, AC Spark Plug, Champion Spark Plug, Woodward, Delco-Remy, Hartzell.

6:30 p.m. to 7:30 p.m. **"FIRST-NITER" HOSPITALITY HOUR**
Bellevue Stratford—Clover & Red Room.
(Courtesy of our generous sponsors listed in the program.)

7:45 p.m. **"FIRST-NITER" BANQUET**
Bellevue Stratford—Ballroom, 1st Floor. (Please refer to page 64)
Official Presentation—Miss Business Aviation, 1958.
Presentation of Women's Aeronautical Association of Kansas Business Flight Safety Award.

TUESDAY, September 23, 1958

REGISTRATION CONTINUES 8:30 a.m. EXHIBIT AREA OPENS 9:00 a.m.

AIRCRAFT ENGINE AND ACCESSORIES SYMPOSIUMS

There will be present at these symposiums the engine manufacturer's representatives and representatives of the manufacturers of carburetors, magnetos, starters, pumps, generators, spark plugs and propeller governors that are used on these engines. Up-to-date information, latest service and maintenance techniques, recommended operational procedures will be presented in brief, clear-cut manner by authorized company spokesmen. Question and answer period follows each symposium.

15 a.m. to :45 a.m. CONTINENTAL ENGINES AND ACCESSORIES

Rose Garden—Bellevue Stratford, 18th Floor. (Please refer to page 64)

PARTICIPATING—Continental, Stromberg, Scintilla, Pesco, Bendix-Utica, Delco-Remy, AC Spark Plug, Champion Spark Plug, Woodward, Hamtilton-Standard, Hartzell, Thompson.

15 a.m. to :45 a.m. ROLLS ROYCE ENGINES AND ACCESSORIES

Green Crystal Room, Bellevue Stratford. (Please refer to page 64)

PARTICIPATING—Rolls Royce, Vickers and Accessory Representatives.

15 a.m. to :45 a.m. WRIGHT ENGINES AND ACCESSORIES

Crystal Room, Bellevue Stratford. (Please refer to page 64)

PARTICIPATING—Wright Aeronautical and Accessory Representatives.

:15 p.m. to 45 p.m. PILOT SAFETY AWARDS LUNCHEON

Grand Ball Room, Bellevue Stratford. (Please refer to page 64)

Host—Insurance Company of North America Companies, Philadelphia, Pennsylvania.

Presentation of Safety Awards to 500,000-Mile and Million Mile Business Pilots.

00 p.m. to 00 p.m. THE WEATHER BUREAU'S FIVE YEAR PLAN

Speaker—U. S. Weather Bureau Representative. Bellevue Stratford, Rose Garden (Please refer to page 64)

A program to provide better dissemination and greater accuracy.

15 p.m. to 00 p.m. NBAA's RECOMMENDED STANDARDS MANUAL

Bellevue Stratford, Rose Garden. (Please refer to page 64)

A review of the recently issued NBAA Manual outlining its objectives, format, material and plans to keep it up.

30 p.m. to 30 p.m. NBAA ANNUAL HOSPITALITY HOUR

Clover and Red Rooms, Bellevue Stratford.

(Courtesy of our many sponsors listed in the program.)

45 p.m. NBAA COMPANY SAFETY AWARDS BANQUET

Grand Ball Room, Bellevue Stratford. (Please refer to page 64)

Presentation of NBAA Annual Safety Awards to Member Companies.

NBAA Awards Committee

Presentation of NBAA Meritorious Award.

WEDNESDAY, September 24, 1958

NBAA welcomes the distinguished members of the National Association of State Aviation Officials (NASAO) who join with NBAA in participating in today's program.

REGISTRATION CONTINUES 8:00 a.m.
EXHIBIT AREA OPEN 9:00 a.m. to 6:00 p.m.

15 a.m. to :30 a.m. JOINT NBAA-NASAO AIR TRAFFIC CONTROL SEMINAR

Rose Garden, 18th Floor, Bellevue Stratford. (Please refer to page 64)

Air Traffic Control specialists from the governmental agencies will discuss:

(1) What is the next immediate step forward in air traffic control?

(2) What are the long range plans for the future?

Participating—CAA—CAB—AMB—AF

Question and Answer Period.

:40 a.m. to :30 p.m. BUSES LEAVE HOTEL

For Philadelphia International Airport to Atlantic Aviation Hangar.

12:15 p.m. to 1:30 p.m. **BUFFET LUNCHEON**
Atlantic Aviation Hangar.

1:45 p.m. to 6:00 p.m. **CIVIL AIR POWER ON PARADE**
Flying and static displays of the latest production and prototype civil aircraft. Fixed wing, helicopters, VTOL and STOL aircraft manufacturers have been invited.

INVITED TO PARTICIPATE

Aero Commander	Doman	Hiller	North American	Piper
Beech	Fairchild	Kaman	On Mark	Republic
Bell	Grumman	Lockheed	Omega	Sikorsky
Cessna	Helio	Mooney	Piasecki	Vertol

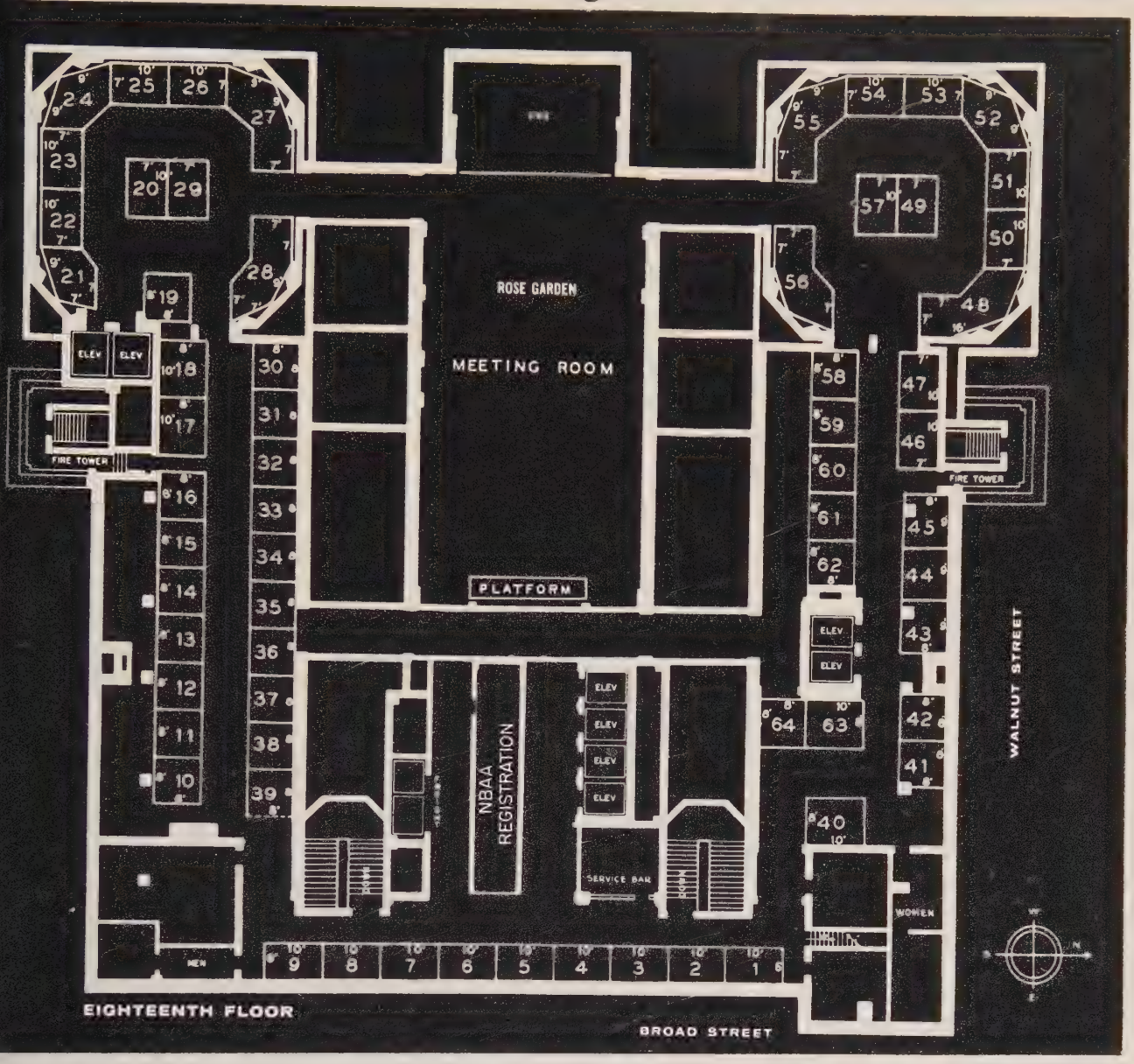
4:00 p.m. to 6:00 p.m. **BUSES LEAVE AIRPORT**
Return to Bellevue Stratford.

7:00 p.m. to 12 midnite **"PENNSYLVANIA DUTCH NIGHT"**
Main Ballroom—Bellevue Stratford.
No hex signs on this affair. Treat yourself to the fabulous Pennsylvania Dutch food, enjoy authentic upcountry dances and music in the gay atmosphere of this picturesque region. Entertainment, dancing, and all the fixin's!

NBAA Annual Meeting and Forum Adjourns

PHILADELPHIA ARRANGEMENTS COMMITTEE *included those shown here. Seated from left, Don Redpath, exhibits chairman; Robert Davis, entertainment chairman. Standing from left, William F. E. Morrison, chairman; John H. Sellers, asst. to chairman; Manny Hamill Jr., airport chairman; J. Story Smith, transportation chairman; J. C. Davidson, asst. to chairman, and Col. A. B. McMullen, executive director, Nat'l Assn. of State Aviation Officials; John W. Macfarlane, executive director, Pennsylvania Aeronautics Commission. The latter two helped coordinate plans for the joint NBAA-NASAO meeting to be held Sept. 24. NBAA committee members not shown are Gene Wyble, publicity, who took the photo; David Dows, exhibits; Frank D. Dyer, finance chairman; Gene Hosmer, housing chairman; Robert B. Ward, publicity chairman; and Edgar F. Smith, committee member.*

NBAA 11th Annual Meeting and Forum Exhibitors



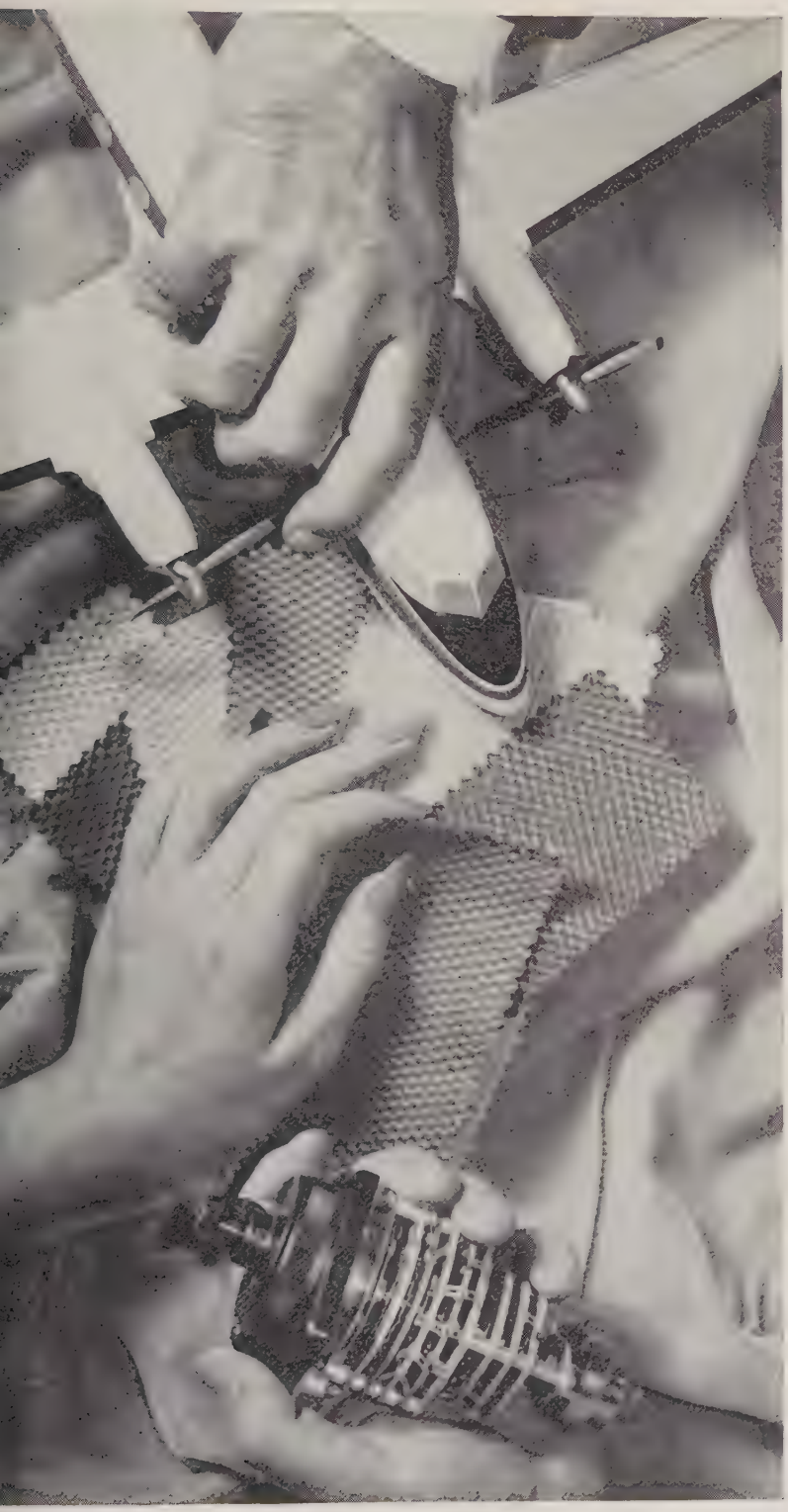
TH	COMPANY NAME (ALPHABETICALLY)
	AC Spark Plug Div., General Motors Corp. J. M. Shimek, A. Candelise, J. R. Church, A. E. Gossett, R. H. Waidelich
51	**Aero Design and Engineering Co.**
	Aerojet-General Corp. G. E. Rice, Frank Dolinski, J. W. Jeffryes
23	**Aeroquip Corp.** A. H. Wagner, Welsh Godon, Paul Fox
	Aircraft Radio Corp. Syd Meacham
	AiResearch Aviation Service Co. Harold Richardson, Donald Neumayer, Harold Jeffrey, S. E. Miller
	Airwork, Inc.
	American Pamcor Co.
57	**Atlantic Aviation Corp.** V. E. Larimer, Henry Kabbash, W. E. Richards, Joseph Rhodes, D. R. Redpath, John Simpson, E. R. Cain, John Erskine, S. M. Ayton, R. B. Ward, E. J. Johnson, L. T. Hatcher

33	**Avco Mfg. Co., Lycoming Division** H. W. Crum, S. A. Shimer, William Russell, Joseph Diblin, Warren Walters
19	**Bay Aviation Services Co.** E. H. Gough, John Roden, Ralph Kummer
56	**Beech Aircraft Corp.** Leddy Greever, W. L. Henry, W. F. Balzerick, M. J. Gordon, D. C. Spillman, Tom Gillespie, R. G. Oestreicher, Cliff Boyer
34	**Bell Helicopter Corp.** Joe Mashman, A. L. Fornoff, Charles Strachan, Fred Roscoe, J. H. Orpen, E. W. Goshorn, Raymond Anderson
58 to 62	**Bendix Aviation Corp.** Products Div., F. W. Kreuger, L. L. Swartz; Radio Div., C. I. Rice, H. A. Wolf, D. G. Erskine Jr., C. O McAtee, G. L. Adrich, W. H. Abshire, A. J. Rogers; Red Bank Div., N. P. Barny, S. R. Chase, J. P Breickner, T. A. Fuorry, J. Flockhart, R. E. Garrison, R. F. Moss, M. P. Bivona, E. R. Wright, F. Lloyd
13	**Central Aero Supply Co.** Mario Federici, Thomas Fulginiti
63	**Cessna Aircraft Co.** Dr. Leslie Thomason, James Herrick, William Ferguson, Charles Porter, Frank Thompson
43, 44, 45	**Chamberlain Aviation, Inc.** J. M. W. Chamberlain, W. B. Carrell, J. W. Hale, E. E. Baker, C. E. Wheeler
10, 11, 12	**Collins Radio Corp.**
24	**Dayton Aviation Radio & Equipment** Louis Pitinsky, Elliott Polansky
30, 31	**Dresser-Ideco Co.** Tom Singell, Bob Ray, Dan Byrd
15	**General Precision Laboratories**
14	**Grimes Manufacturing Co.** Robert Cummins, William Creviston
53, 54, 55	**Grumman Aircraft Engineering Corp.** H. J. Schiebel, John Jeffries, Kenneth Douglas, John Parkinson, J. G. Schnabel, N. G. MacKinnon
32	**Jeppesen & Co.** E. B. Jeppesen, W. A. Prescott, L. T. Hancock
35, 36	**Lear, Inc.** W. P. Lear, Sr., Al Banas, Ed Conklin, Walter St. John, Matt Krim, P. O. Momenteller, Ken Melto Bob Mays, Ed Drake
4, 5	**Lockheed Aircraft Corp.** B. B. Bundesman, J. L. Norton, Stan Walsh, J. J. Schlotman, Lee Rogers, M. L. St. John, Turner Hiers, Leo Sullivan, Lloyd Harris, Les Hewitt, Bill Plage, Fred Valz, Jim May, Norm Keller
20	**McMillan Industrial Corp.** A. M. Brink, D. R. Humphreys
40	**Minnesota Mining and Manufacturing Co.** M. Longlet, J. E. Richardson, D. T. Richardson, W. A. Graham, R. Peiffer
8	**National Aeronautical Corp.** J. M. Riddle, G. F. Quinby, E. R. Garfield, W. J. Heritage, Bert Rashkow, J. E. Monaco, Eugene Rudd
1	**Northwestern Aeronautical Co.** C. L. Harrington, R. J. Randolph, Ed Morris, W. F. Simonsen

(Continued on page

IREE-WAY SPECIALIZATION:

Top Hands" Offer Gulfstream Package



HORTON & HORTON, ASSOCIATED RADIO LINKED WITH SAC

Sometimes three "top hands" are better than one.

Such is the case with a three-way package plan conceived by Southwest Airmotive for distributing, equipping, and servicing Grumman's great, new turbo-prop Gulfstream.

The hand distributing the aircraft, and providing for the continuing maintenance of the airframe and its Rolls-Royce Dart engines, is that of Southwest Airmotive at whose plant Grumman and Rolls-Royce field service representatives will be based for consultation.

The magical touch of beauty will be applied by the hand of Horton & Horton Custom Works, Inc., commissioned by us to design, engineer, and fabricate Gulfstream interiors in cooperation with the Southwest Airmotive aircraft division at Dallas.

Our third "top hand" is Associated Radio, Inc., which we have appointed to engineer and install Gulfstream electronics and radio systems. Shops of this Hemispheric-favorite now are housed in space leased in SAC's new facility at Dallas' Love Field.

Personal presentations of this plan will be made anywhere in the U. S. at the customer's convenience. Write for details.

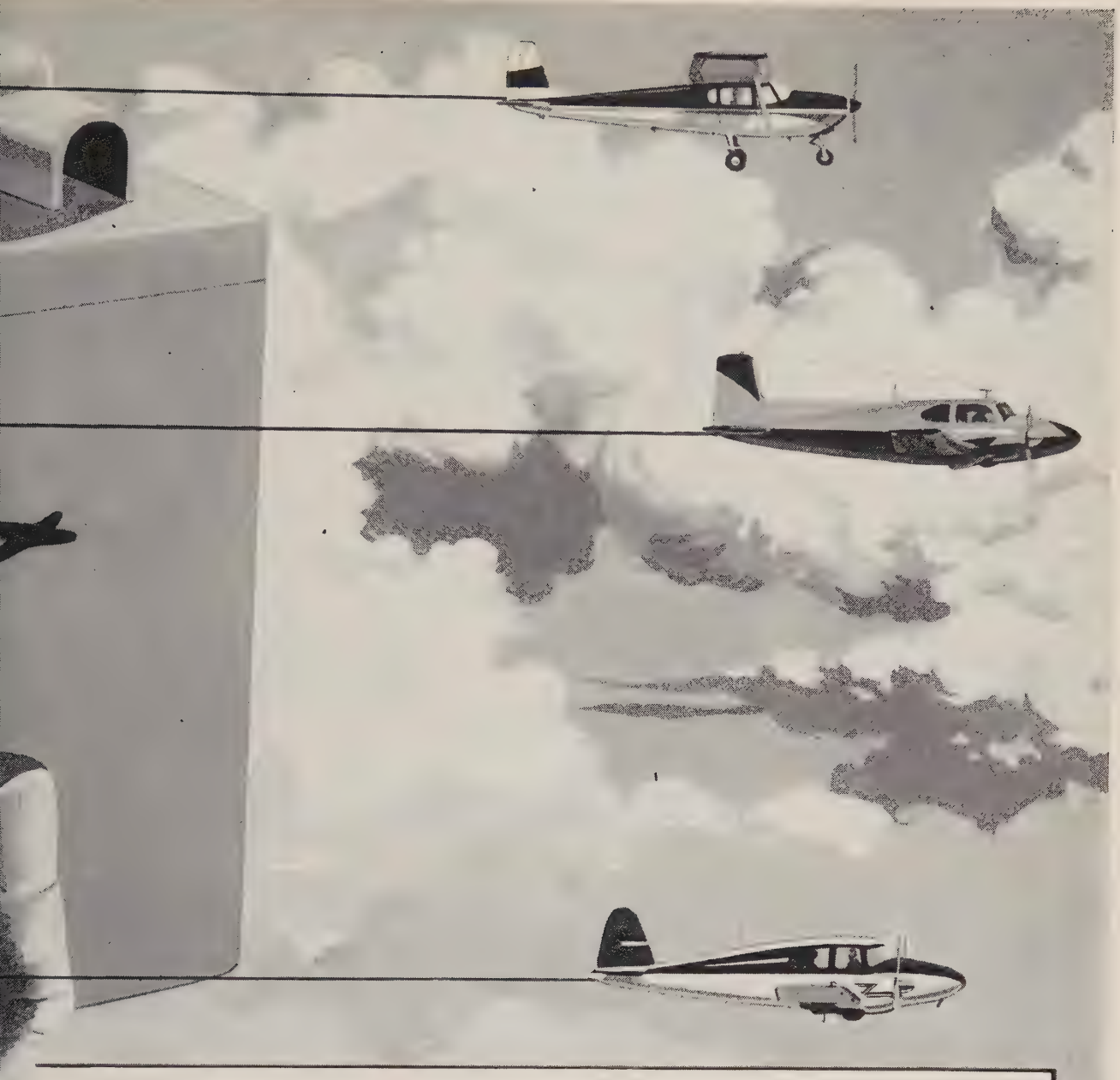
Southwest Airmotive Co.

LOVE FIELD, DALLAS

DISTRIBUTION DIVISIONS: KANSAS CITY • DENVER

Circle No. 55 on Reader Service Card

SAFE–new low height, nonspill vent plugs.
SAFE–new fully insulated top–no exposed metal.
LIGHTEST–new lightweight, high impact polystyrene container.



Never before a private plane battery with such compact power and long life potential

Only Exide could bring you this battery . . . materials and construction proved in commercial plane batteries for 3 years

Here's a new 12 volt battery designed especially for today's advanced private planes. Inside it packs up to 16% more power in actually less space than comparable batteries. And it can save you pounds of weight. Here for the first time is a private plane battery with Exide's new supergranulated active material that boosts battery power. Patented Silvium corrosion-resistant plate grids stretch battery life. Exide commercial plane batteries proved the value of these materials for 3 years. Now you too can have them. This new battery is available in two models: AC-60 and AC-54. Both same size . . . fit most standard battery compartments. Factory fresh wet or dry charged. In stock now. See your dealer and be sure to specify Exide for your new plane.

Exide®

Exide Industrial Division
The Electric Storage Battery Company, Philadelphia 2, Pa.

Circle No. 56 on Reader Service Card

BUSINESS AIRCRAFT EQUIPMENT

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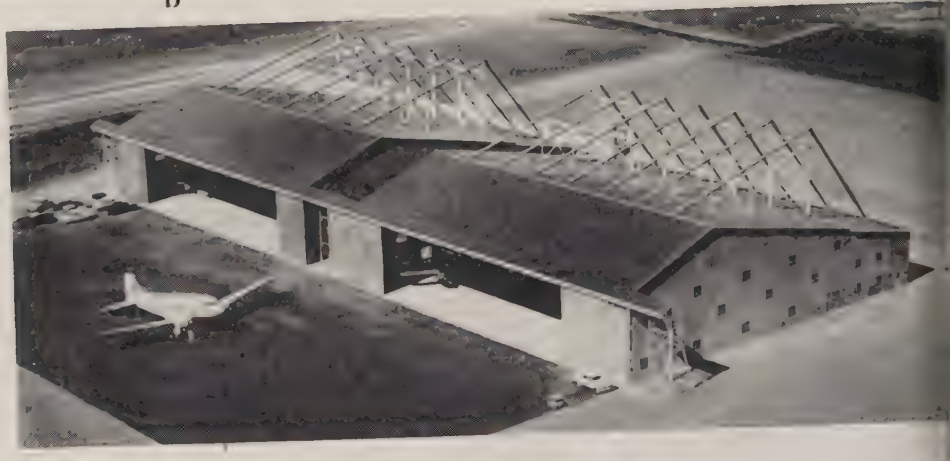

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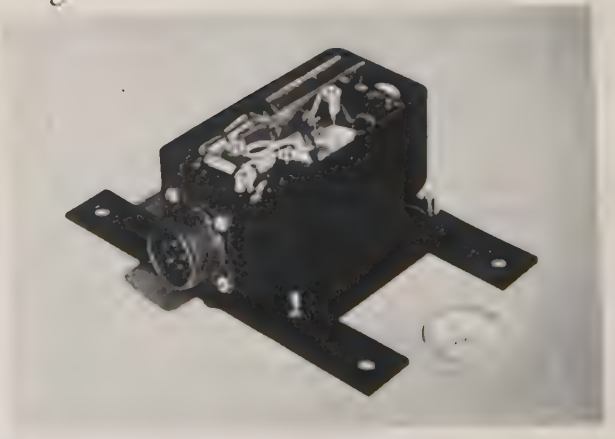

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k

oducts that are important to the aircraft and pilot

any modern business airplane cabins bear closer re-emblance to executive offices than they do to airline teriors. And just as an airline coach seat would look ut of place in any business office, so do they in the air. n modifying or updating an aircraft interior, seating is focal point of the design. Latest production model in ie Hardman line of corporate aviation seating is the orporate Starest, an extremely lightweight 9-G chair. lthough each unit only weighs approximately 23 lbs, it designed for maximum comfort in contemporary styl-ig. It is available in single or double configuration in a noice of mounts, side panel designs and fabrics. Desig-ated No. 3070, the chair may be installed in a Beechcraft 8 or larger aircraft. **Circle No. 57 on Reader Service Card**

Aircraft spark plug maintenance differs from automo-ve practice in two major respects—*more* plugs to be ested *more* often. Any new equipment that helps relieve his problem is important. The aircraft spark plug elec-ric bomb testing unit manufactured by AC Spark Plug Div., General Motors Corp., is used primarily to provide reliable means of electrically testing the ceramic insu-ation of the sealed type 18mm aircraft spark plug. This nit is suitable for a workbench operating with 110-120 olt current and utilizing CO_2 or nitrogen in the bomb hamber. The feature of this unit is the facility and ease f operation. Upward of 725 spark plugs can be tested er hour, approximately twice as many as were previously ttainable. **Circle No. 58 on Reader Service Card**

High pressure Teflon hose with leakproof "super gem" ttings has been announced by Aeroquip Corp. Featuring spiral wrap construction engineered for lasting strength nd resistance to impulse fatigue, the hose is designed or 3,000 psi aircraft systems. The spiral construction revents brinelling of the stainless steel wire, eliminates vire stress concentration common in braided reinforce-nents and provides optimum strength without sacrifice f flexibility. Teflon hose functions in temperature ranges f —100°F to +500°F. **Circle No. 59 on Reader Service Card**

Company crews, usually lacking that charming accessory fter the fact—a cabin stewardess, must provide a con-enient practical way to serve food or refreshments or to nable passengers to assist themselves. Custom engi-eered by Reading Aviation Service, Inc., is a fold-away ype aircraft table which provides a full length table vithin fingertip reach. The table is a compact unit, rigid nd strong, weighs 4 lbs and is easy to install. Also sable as an in-flight desk, it can be color mated to the ircraft interior. It is ready for installation in the Aero Commander, Apache, Twin Bonanza, Travel Air, Cessna 10 and 195. **Circle No. 60 on Reader Service Card**

Business flight operations can be delayed by the compli-ations of shared storage in large common hangars. Many companies are finding it better to erect their own torage facilities. Cantilevered type hangars, produced by Erwin-Newman Co., are typified by installation shown ere. These twin hangars were built for the Delhi-Taylor Co. and Collins Radio at Addison Airport, Dallas, Tex. Each hanger is 160-ft long with a clear span of 120-ft, ertical clearance of 30-ft and provides future modifica-ion in any direction. The cantilever type construction, ngineering and fabricating has proved to be an answer o efficient and economical hangar requirements for orporations. **Circle No. 61 on Reader Service Card**

f **Series of temperature control** kits suited to various applications on business aircraft is in development by Barber-Colman Co. The cabin thermistor and blower assembly shown is used in two of these kits. TYL 1 is an automatic heater cycling control kit designed to maintain a selected cabin temperature within plus-or-minus 2°F. TYL 4 is a proportioning control kit designed to maintain a selected cabin temperature with plus-or-minus 2°F when heating is accomplished by mixing heated engine exhaust air with cold ram air. These kits meet high commercial and military standards for dependable operation under all environmental conditions. Other kits are being developed for specialized temperature control applications. **Circle No. 62 on Reader Service Card**

g **"Seal-Lock,"** recent development of the Resistoflex Corp., is a reusable fitting for use with high temperature hose of "Teflon," and in particular with Fluoroflex-T hose. The field attachable fittings incorporate a triple-locking feature that prevents fitting blow-off. The fitting is locked to the hose; components are locked to each other. They cannot be loosened by vibration. Two seals designed into the fitting construction are actuated by internal pressure, thereby preventing leaks. They are available in straight and elbow couplings. **Circle No. 63 on Reader Service Card**

h **The "new look"** in business flying today is the radar nose. Although daily more familiar at airports, less well known are the physical problems associated with the modification. CAIR, Chamberlain Aviation, Inc., Akron, Ohio, has announced development of a radome kit for installing "Packaged Radar" on the model E-18 Beechcraft. The illustration shows installation on an E-18 with the radome removed. The kit is designed for use with the RCA AVQ-50 and has provisions for mounting the transmitter-receiver, accessory unit, as well as the antenna, inside the radome. This arrangement results in a sizable reduction in down-time and cost of installing weather avoidance radar. **Circle No. 64 on Reader Service Card**

i **Burns Aerorest seat** designed for jet and prop-jet planes provides such incorporated features as integral folding food tables in the seat back; high, clear underseat clearances; integrated armrest recline controls; seamless molded armrests; full folding "delethalized" backs with self-ejecting armrests. **Circle No. 65 on Reader Service Card**

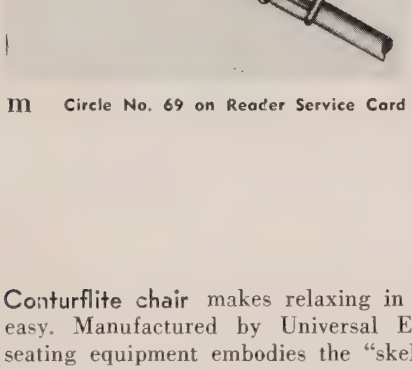
j **A transistorized,** electronic position light flasher has been developed by P. R. Mallory & Co. Inc. It is claimed to provide exceptionally long service life, freedom from radio interference and considerably smaller size and weight then previous models.

CAA-approved, the flasher is an all-electronic device using transistor circuits for switching. It has no mechanical moving parts. It can be expected to operate indefinitely. It is available in two models: for flashing both wingtip and tail lights simultaneously and a larger size flashes alternately. **Circle No. 66 on Reader Service Card**

k **Winslow CP (Controlled Pressure) Aerofilters** for lighter business aircraft increase the life of moving parts by removal of harmful abrasive material. Damaging abrasives are introduced to the engine, produced by engine operation, and are present before the engine has turned over under its own power. Winslow CP Full-Flow Filtration filters all oil each time it circulates through the engine. **Circle No. 67 on Reader Service Card**

BUSINESS AIRCRAFT EQUIPMENT

l Circle No. 68 on Reader Service Card



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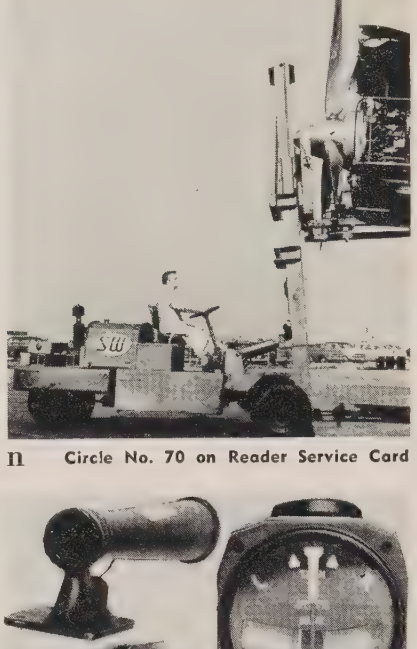

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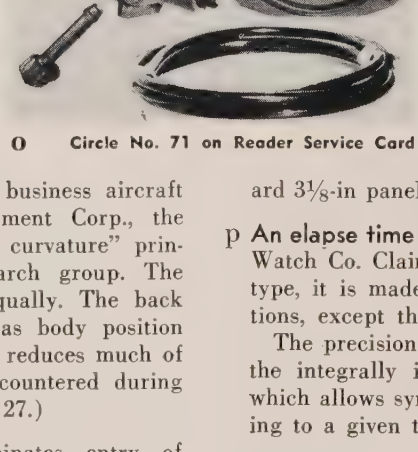
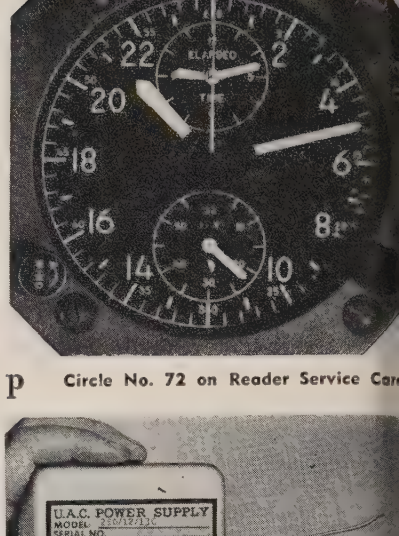
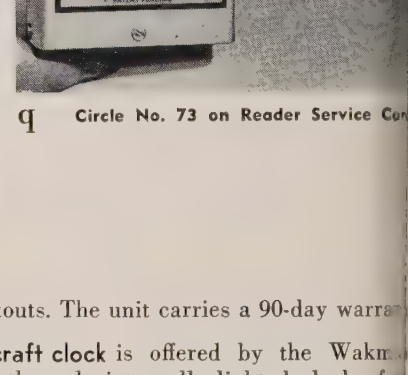


o Circle No. 71 on Reader Service Card



p Circle No. 72 on Reader Service Car



q Circle No. 73 on Reader Service Car

l **Conturflite chair** makes relaxing in the business aircraft easy. Manufactured by Universal Equipment Corp., the seating equipment embodies the "skeletal curvature" principles recommended by a medical research group. The chair is designed to distribute weight equally. The back and the seat adjust themselves together as body position changes. A leg rest for reclining positions reduces much of the "uncomfortable weightiness" often encountered during long trips. (See Skyways, May 1958, page 27.)

m **A moisture proof window connector** eliminates entry of moisture due to breathing caused by altitude changes in aircraft circuitry. Released by AMP Inc., the connector is designated Certi-Seal Splice.

The Splice is designed with tin-plated copper rings at both ends which crimp over the wire insulation for a permanent seal against vapors and fluids.

n **Silent Hoist Liftruk** speeds engine change process for Seaboard & Western, helping to cut the time from eight to less than four hours.

Made possible by the combination of an engine-change dock and the Liftruk, engine changing process can be applied to business aircraft. The vehicle positions the service dock around the engine. As engine is disconnected, the Liftruk is adjusted to take up the weight. When all bolts are cleared, the complete powerplant is backed away from the firewall by the vehicle.

o **Turn and Bank Kit** includes a newly certified Pioneer turn and bank instrument with luminous dial paint. Newly calibrated, the kit is produced by Aircraft Components.

The Kit includes an air filter on the instrument, all necessary hose, fittings, 2-in aluminum venturi, vacuum adjusting needle valve and instructions. The instrument fits all standard 3⅛-in panel cutouts. The unit carries a 90-day warra

p **An elapse time aircraft clock** is offered by the Wakm Watch Co. Claimed the only integrally lighted clock of type, it is made in strict accordance with USAF specifi tions, except that the dial is 24-hour.

The precision timepiece, Type ABU-3/A, contains besi the integrally illuminated dial an exclusive hack feat which allows synchronizing of hands "at the second" acco ing to a given time signal.

q **Transistorized power supply** series which provide the o put required to operate receiver installations is availa from Universal Transistor Products Corp.

Easily installed, the units wire directly to battery mobile equipment. They are direct replacements for c ventional vibrator type power supplies. Features inclu operating life in excess of 10,000 hours, efficiency to 85 elimination of high current starting surges, moving parts vibrator "hash."

Typical unit, model 250/12/130, produces 250 VDC 130MA from 12VDC input in a 2"x3½"x3" package. Wei is 12 ounces; cost, $65.00.

Runways don't really shrink when they get wet, but an multi-hour pro will swear they do. Next to the low-limi approach, the touchiest test of pilot skill is "tieing o on" a slippery runway cross-wind, and resisting th temptation to stand on the brakes as the far end ge uncomfortably close. A skid-warning system, capable detecting an impending tire skid in time to give an ai craft pilot a warning thump on the foot to ease up the brake pressure, is being marketed by the Aviati Products Div. of The Goodyear Tire & Rubber Co. T sensory device, lodged in the wheel axle, transmits el

l impulses which activate the foot-thumping plunger, ed in the brake pedal. The system extensively tested irlines and by simulating aircraft landings on com- dynamometers, decreases flight delays by ending vertent tire blowouts and flat spotting, shortens land- distance, and, at the same time, enables the pilot to ıtain safe, complete control of his aircraft.

A-approved for barrel bore reclamation since 1944, der Horst Porus-Krome is used extensively by opera- of corporate aircraft. Once plated with Porus-Krome, rrel bore is virtually wear-proof. In addition, Porus- ne plated cylinder bores contribute to a reduction in ne lube oil consumption. Jugs, received stripped at der Horst plants, are first ground dimensionally true, ed, then honed to a perfect surface finish. Finished dimensions conform to manufacturers' tolerances. choke where applicable.

principal resistance to the use of shoulder harness ivil aircraft seems to be the personal inconvenience ediately associated in the mind of the pilot. Sta- cally, there can be no serious challenge as to the eased safety value over the accepted seat belt. An rgency restraint system engineered by Pacific Scien- Co. introduces an entirely new concept in civil flight onnel protection. The user has complete freedom to e forward from the waist to perform necessary cock- duties. Yet in any emergency which tends to throw occupant from the seat at an acceleration from 2 to 3 in any direction, the "Reel-Safe" locks instantly and rely in the "Saf-T-Matic" buckle system. This permits pilot to attach the shoulder harness and lap belt by gging the straps into the buckle. There are no long ps to thread. A quarter-turn of the buckle face in er direction releases all straps instantly.

Circle No. 74 on Reader Service Card

Increased performance in "kit" form is evidence that Garrett AiResearch Division has cast its bait for the "do-it-yourself" market. Noted for their Maximizer speed modifications at the Los Angeles base, AiResearch now offers the "Maximizer" modification, guaranteed to increase the speed of DC-3 aircraft by 20 mph with no added horsepower, in kit form for DC-3 operators and interested fixed base operators.

It is easily installed using aircraft tools found in any maintenance facility. Included are scientifically contoured baffles with interrelated engine cowl, modern "Siamese" exhaust system, diffuser entrance fairing for oil cooler, wheel well doors and tail wheel fairing.

The speed increase is but one performance step-up in virtually all phases of DC-3 operation. It also improves single engine climb, service ceiling, payload and economy. Result, AiResarch is pulling in a capacity work load. End.

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SAFETY DIGEST

RICHARD W. GROUX, *Assistant to Executive Director NBAA*

Compiled and edited from leading air safety publications issued by military, naval, airline, government agencies and from private and business pilots' experiences.

Joint-Use Restricted Control Areas

Better take a good look at the Portland Military Climb Corridor. This plan represents a basic compromise between military and civil airspace users in their approach to airspace use problems. It provides an acceptable departure corridor for high performance Air Defense Command jet aircraft with minimum interference to other air traffic.

Recent Military/CAA tests disclosed that ADC pilots during an actual "scramble" are unable to see and avoid other aircraft during the climb phase even during the *best* VFR conditions. Today each air Defense Command base uses as many as a dozen different departure routes. These routes although usually the result of local Military/CAA coordination are *not* published for general distinction.

All of the following measures were considered; High Density Air Traffic Zones, Caution Areas, Positive Control Climb Corridors, Restricted Area before the Restricted/Control Area plan was adopted . The Restricted/Control Area plan succeeds in channelizing all Air Defense Command "scrambles" to *one* graphically portrayed *published* corridor. The restricted air space corridor remains available, upon prior ATC approval, to all traffic except during times of actual military use. Corridor direction is based on what creates the least interference with other traffic and still meets military requirements.

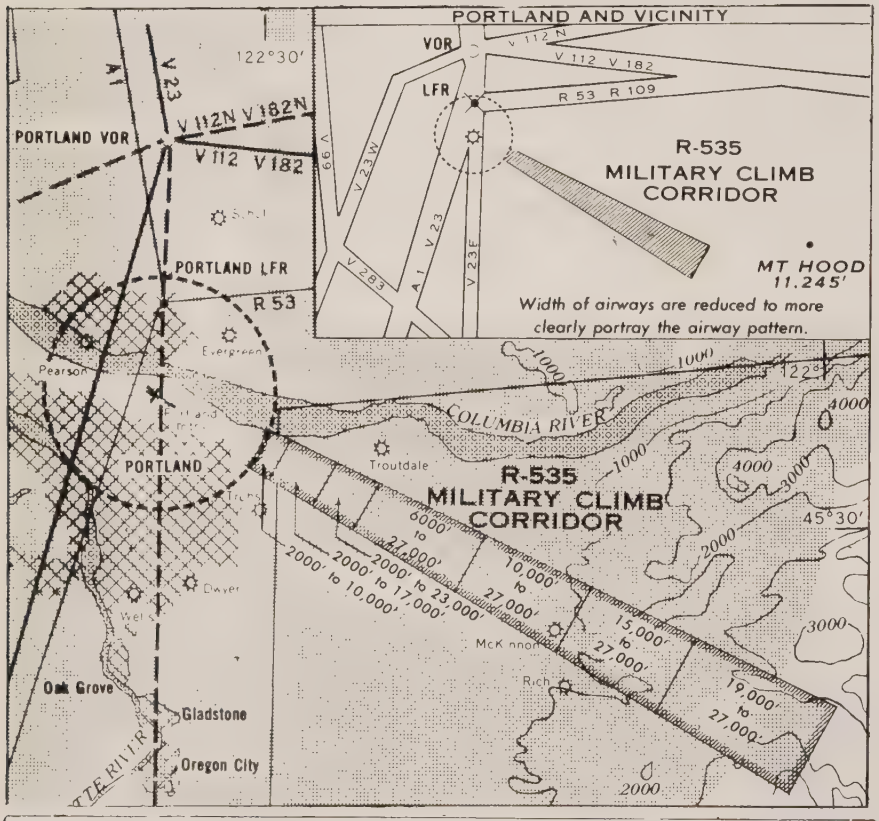
Corridors to be Designated:

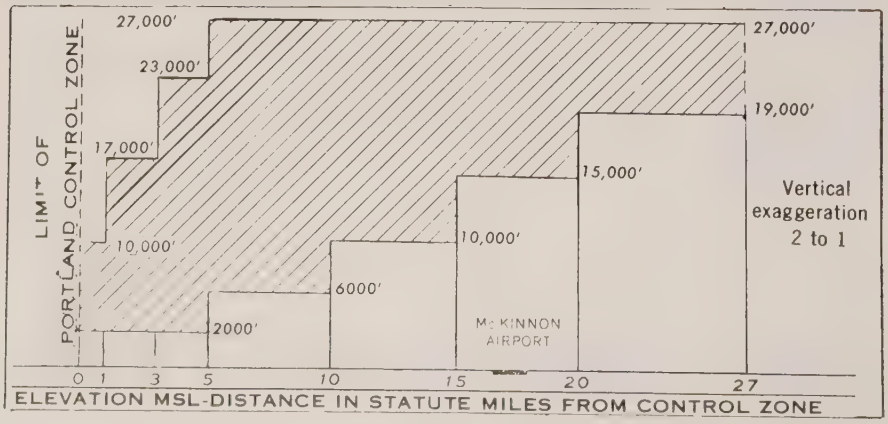
Andrews	Wurtsmith
Bunker Hill	McChord
Castle	McGuire
Charleston	Malmstrom
Davis-Monthan	Niagara Falls
Dover	Otis
Duluth	Oxnard
Ellsworth	Portland
Ethan Allen	Sawyer
Geiger	Scott
George	Selfridge
Grandview	Seymour Johnson
Griffiss	Sioux City
Hamilton	Stewart
Hanscom	Suffolk
Kinrose	Travis
Kirtland	Truax
Klamath Falls	Westover
Langley	Wright-Patterson
Larson	Youngstown
Lockbourne	

Designation Process:

Restricted/Control Area corridor requests are processed through the Regional Airspace Subcommittees of the Air Coordinating Committee. The Subcommittees are located in New York, Atlanta, Kansas City, Mo., Los Angeles, Seattle, Honolulu, and Anchorage.

The recommendations of the Regional Subcommittee are then forwarded to the Washington Airspace Division for final consideration before a decision is taken by the Administrator of the CAA.





Seen A Power Curve Lately?

by Maj. Wallace W. Dawson
Research & Analysis Div., DFSR

Ran into a fellow down town the other day, said he was trying to buy a power curve. Heard so much about not getting on the back side of one, though he'd get one of his own and paint the back side red, so he'd be sure to stay off of it. This sounds real sensible and it's sure a shame it's not that easy. However, power curves, like so many other things we deal with, are not quite so easy to tie down.

A power curve—or more correctly—a speed-power curve might be defined as the relationship between the power available and total drag throughout the speed range of the aircraft. Quite obviously the higher speed we want, the more power we need. It follows the

(Continued on page 58)

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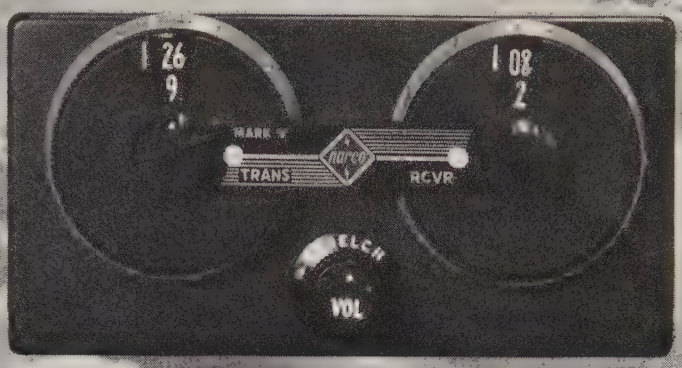

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CROSS-CHANNEL OPERATION. Separate transmitter and receiver selectors give you complete flexibility of operation—simplex, double-channel simplex, cross-channel.

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See the Mark V at your Narco dealer's or write for brochure.

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Safety Digest

(Continued from page 56)

that if we want to fly at a slower speed we reduce the throttle and the bird slows down to where the power required is equal to the power available. We could keep doing this indefinitely except for one thing, and that's the "fly in the ointment."

As we continue to reduce power and speed we have to raise the nose to maintain altitude. This is fine to a point, but beyond that point it's no good at all. As the nose comes up, induced drag —which we might call drag "induced" by the production of lift increases. So, although we are flying slower, the power required is greater, not to be converted into speed but just to keep some ozone between the bird and terra firma. This is the "back side" of the power curve, the point beyond which reducing speed requires more, instead of less, power to keep 'em flying.

All this is very well, and, on the surface, looks like all that is needed is to increase the engine power. True, but eventually we come to the point where the engine is putting out all it's got. In other words, there "ain't no mo'." This is the dangerous situation; this is when everything's open but the tool box, to the wall. Hanging on the props, or pulling 101½ per cent you're still just staggering through the air.

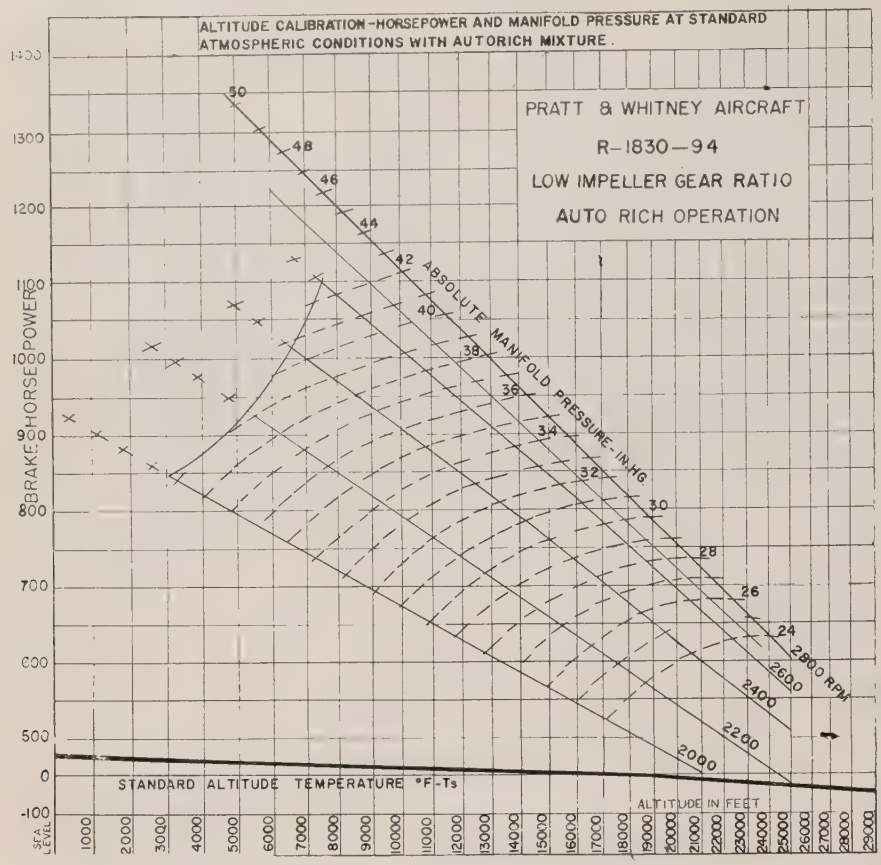
One thing about it, you won't have to worry about this condition very long because it won't last long. Either you reduce the induced drag by getting the nose down or you clobber. Of course if you're fortunate enough to get into this not-so-humorous situation with eight or ten thousand feet of altitude under you—fine. Sacrifice some of this lovely stuff and get back on an even keel. If, however, "it" happens to you —as it does to most—close to the ground, this is the day you should have "stood in bed."

Well, so there's the problem. Now what's the answer? Actually, it's so simple, it's pitiful. Just don't allow your bird to get into a combination of altitude, attitude, and airspeed where full power won't pull you out.

As we said, "it" most often happens close to the ground. Final approach, go around, GCA, trying to stretch a simulated flameout, short field, single engine. Any time and place when, and/or where, things aren't exactly normal. These are the times to be just a little extra cautious, sure of the recommended final approach speed for your weight and conditions—alert every second for any indication that she might be slippin'. "It" can be avoided, and easily too, if you just fly right.

So don't really sweat it—that's not the purpose of this article. Just know that "it" exists and act accordingly. (Flying Safety USAF)

Safety experiences—or suggestions? Write Dick Groux, NBAA, Wash. 25, D.C.



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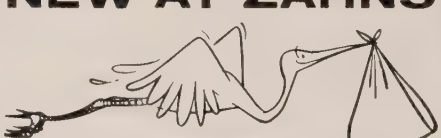

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NBAA-Exhibitors

(Continued from page 48)

25, 26, 27	**Pacific Airmotive Corp.**
46, 47	**Piper Aircraft Corp.**
37	**Radio Corp. of America** David Robinson, John Whitehead, A. Kirkpatrick, E. Lynch, G. R. Daggy, T. F. Shannon
28	**Reading Aviation Service, Inc.** A. M. Bertolet, E. D. Kelley, C. M. Betrolet, R. H. Breithaupt, J. W. Thompson, D. J. Melville
52	**Rolls-Royce of Canada**
21	**Southwest Airmotive Co.** P. A. Kennedy, M. A. Barbettini, Earl Webb
42	**Springer Aircraft Radio Corp.** E. W. Springer
16	**Tactair Autopilot Division** R. B. Springer, J. H. Stephens, E. M. Hunt, L. F. Sierp
18	**The Sierracin Corp.** J. E. Slatky, J. E. Field, F. J. Carrig, Jr.
17	**Wilcox Electric Co., Inc.**
41	**William C. Wold Associates** W. C. Wold, J. T. Barta, T. H. Hintze
64	**Wings, Inc.** O. F. Jenkins, Jr., Frank Mustice, J. S. Smith
38, 39	**Woodward Governor Co.** G. W. Taylor, B. E. Burridge, J. W. Drake, Maynard Bender

(Continued on page

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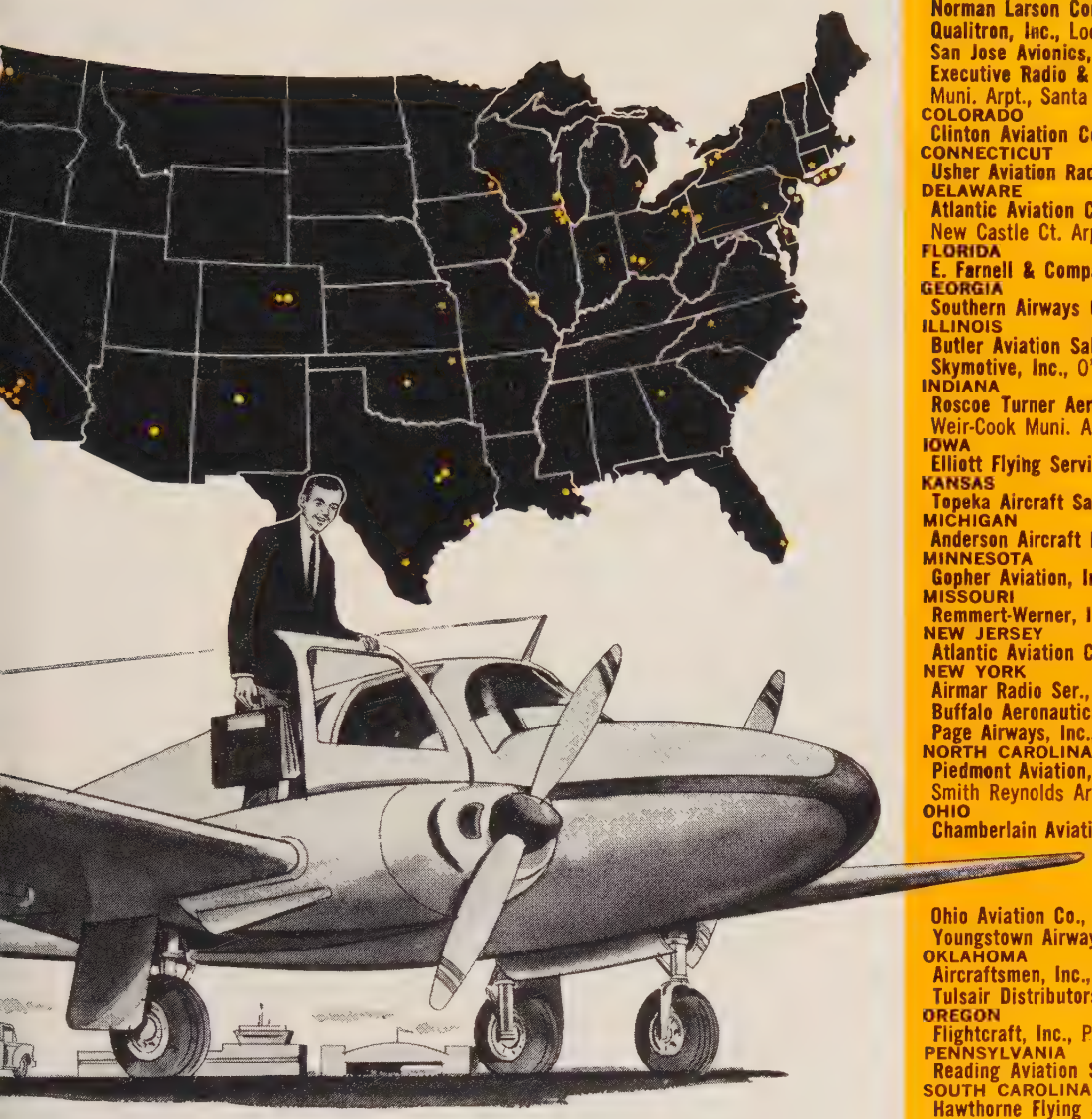

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Helicopters for Business

McDonnell Develops Cargo Copter

McDonnell Aircraft Corp. has developed a cargo helicopter believed capable of lifting more weight for its size than any similar craft.

The multi-turbine-engine craft, known as the Model 120, has a revolutionary rotor and drive system combined with a utility type airframe of unprecedented simplicity and versatility, according to McDonnel.

The helicopter has an empty weight of 2,400 lbs and a maximum takeoff gross weight of 6,300 lbs. The useful load is 62% of gross weight, unusually high for a helicopter, the company claims.

Pressure jet burners mounted on three rotor blades with compressed air supplied by three gas turbine compressors, power the craft.

The new and unique rotor system is the result of nine years of development effort and was developed originally for the McDonnel XV-1 Convertiplane completed for the Army in 1954. This rotor is unusually free of vibration and provides the inherent stability long sought in helicopters, says McDonnell.

The compressed air for the pressure jets is supplied by three AiResearch GTC-85-35 gas turbine compressors. This propulsion system eliminates the need for power shafting, gear box, clutch and tail rotor, thereby substantially reducing maintenance requirements.

The rotor, capable of being started or stopped in winds of 115 mph, is free of ground resonance and has an infinite fatigue life at 2-G load factor.

The fuselage is extremely simple in design in order to minimize maintenance and to facilitate cargo loading. Cargo is carried suspended from a pilot-controlled cargo hook located immediately below the rotor. In addition to the pilot, 12 persons can be accommodated on "tobaggan seats" which attach to the cross member supporting the cockpit and a similar aft member which is part of a "personnel kit." The kit contains an enclosure to protect the occupants from the wind.

Alouette Sets Six Records

The jet-powered Alouette II set a new world's altitude record for heli

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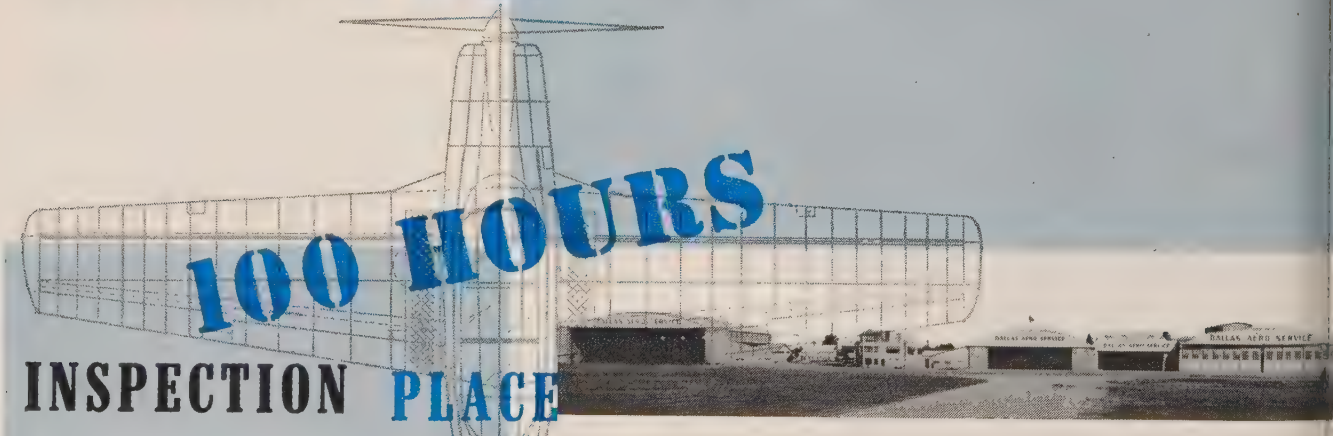

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rs of 36,501.125 feet, one of six
l's marks broken by the aircraft
Paris, according to Republic Avia-
Corp., U.S. distributor for the five-
, French-designed copter.
evious altitude record was set on
29, 1957, by a Cessna YH-41
opter at 30,300 feet.
her records broken by the medium-
e, gas-turbine Alouette were:
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ngers, topping the mark for heli-
rs in the 2,205-to-3,858-lb class;
world helicopter record for verti-
peed of 9,834 feet in 5 min., 31

mbing 19,686 feet in 11 min., 3

mbing 29,529 feet in 17 min., 48

mbing 36,501.125 feet in 35 min.,

e Alouette, developed by Sud Avia-
is the first French aircraft certi-
by the CAA. Assembled and mar-
l in this country by Republic, it is
nly jet helicopter in commercial
n the Western Hemisphere.
is 32-ft long, 9-ft high and has a
-blade rotor with a diameter of
ft. Rate of climb with full load
out 1,000 fpm.

copter Utility Doubled by ote and Auto-Control elopments

vo major breakthroughs in increas-
helicopter usefulness are at hand.
military and civilian experts have
tackling the problem of all-weather
ations. Control problems inherent
e 'copter have unduly complicated
simple application of conventional
attitude control techniques. Auto-
stabilization equipment, some-
similar to the familiar autopilot,
been certificated by CAA for com-
ial operation. Sperry's ASE, proven
ver 100,000 hours of Navy flight
ag, weighs 40 lbs, is capable of
plete "hands-off" operation but is
cted to be used primarily as a 100%
s stabilization monitor, giving the
complete freedom for normal
pit duties as in an inherently stable
entional aircraft. There is no "loss
el" or "resistance" to the controls.
system does not fight him. He can
for varying load conditions.
korsky has successfully demon-
ed a tether system of remote con-
of a 'copter from the ground that
unlimited promise for business op-
rs of working 'copters. The cus-
ry design of 'copters is such that
ilot hovering over a specific job is
iably blind and often must be
ed by other persons on the ground
all the associated problems of
, communications lag, vision, etc.
tether system can take over from
ilot when desired or entirely.

Helicopter Family Flourishes

ll Helicopter Corp. (Hurst, Tex.),
but a year in operation as a wholly-
d subsidiary, numbers 10 models
either in production, under develop-
ment or available for sale. They lead
the industry in production and sale of
commercial helicopters with four
models.

Since receiving the first commercial
helicopter certification in March 1946,
Bell Model 47's have accumulated 2½-
million flying hours. Steps were taken
this year to extend approved major in-
spection period for both 47G and 47G-2
models from 600 to 1,200 hours.

Research and development work of
Bell engineers have funded helicopter
blind flight system to be operational
tested in New York City area, and in
cooperation with Bendix and Decca
have designed and developed superior
instrument flight system for future all-
weather helicopter flight.

A series of intensive scientific tests by
the company have assaulted the icing
barrier to all-weather rotary-wing flight.
Final evaluation of the tests is yet to
be made. Preliminary appraisal holds
promise for a successful de-icing sys-
tem. Bell developed a cyclic electro-
thermal method of de-icing rotor blades
and tested it on both metal and wooden
blades.

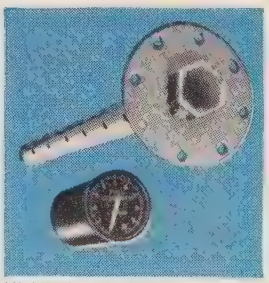
The method provides for imbedding
heater elements in the adhesive which
bonds the stainless steel leading edge
abrasion strip to the basic blade. Elec-
tric current heats the elements.

. . . **smallest PACITRON unit is biggest fuel gaging news . . .**

Simmonds now offers the newest addition to its famous PACITRON Fuel Gage family . . . a small lightweight *transistorized* fuel gage for military and transport aircraft. It is highly dependable and accurate. The replacement of vacuum tubes by transistors permits Simmonds to incorporate amplifier-bridge and indicator into a single smaller unit, saving space and weight.

Simmonds packages three types of PACITRON Fuel Gage systems, custom-built for every requirement: the new 2-unit transistorized gage, the well-known 2-unit vacuum tube gage, and the lightweight 3-unit system. Along with dependable fuel measurement, *ALL* PACITRON systems provide important fuel *management* functions such as Center of Gravity Control, Level Switching, Totalization, Telemetering and Load Limit Control. All systems meet MIL specs.

Complete information on all the above systems is available on request.


Miniaturized indicator-amplifier-bridge and lightweight free flooding tank unit.

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Branch Offices: Detroit, Michigan • Dayton, Ohio • Washington, D.C. • Dallas, Texas
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NBAA Forum Moderators and Speakers

(Refer to page 44)

Value-Per-Mile—Mod: H. W. Boggess, NBAA Board member, Sinclair Refining; Speaker: Dr. Leslie Thomason, Dir., Air Age Education, Cessna Aircraft

Pratt & Whitney — Mod: W. C. Pague, NBAA Board Member, ARMCO Steel

Lycoming — Mod: J. H. Winant, NBAA Treas., Sprague Electric

"First-Niter" Banquet — Presiding: J. B. Burns, NBAA Pres., Fuller Brush; Presentation of WAA of Kansas Business Flight Safety Award; Speaker: A. S. "Mike" Monroney, U.S. Senator, Okla.

Continental—Mod: E. M. Beattie, NBAA Board Member, General Electric

Rolls Royce—Mod: C. F. Zimmerman, NBAA Board Member, Continental Oil

Wright Engines—Mod: Jim Ketner, Jr., NBAA Board Member, Texas Eastern Transmission

Pilot Safety Awards Luncheon—Presiding: R. E. Piper, NBAA Awards Committee, Monsanto Chemical; Speaker: N. H. Dearborn, Nat'l Safety Council Pres.

Weather Bureau's Five-Year Plan—Mod: W. K. Lawton, NBAA Exec. Dir.; Speaker: N. A. Lieurance, Dir., Aviation Weather Services

NBAA's Recommended Standards Manual—Presiding: H. W. Boggess, Chmn, Sinclair Refining; Panel: H. D. Kysor of Aeronautical Consultants, J. H. Winant of Sprague Electric, M. J. Brown of Amp, Inc., W. R. Dotter of Internat'l Harvester, C. A. McKinnon of IBM, Don Richardson of Minnesota Mining and Mfg., E. M. Beattie of GE

NBAA Company Safety Awards Banquet—Presiding: J. B. Burns, NBAA Pres., Fuller Brush

Presentation of NBAA Annual Safety Awards to Members Companies—R. E. Piper, NBAA Awards Committee, Monsanto Chemical

Joint NBAA-NASAO Meeting — Greetings to NASAO: J. B. Burns, NBAA Pres.; Greetings to NBAA: G. M. Nelson, NASAO Pres.

Air Traffic Control Seminar—Mods: B. J. Bergesen, NBAA Board Member and Crocker Snow, NASAO, Chmn, Research and Development Committee; Seminar Participants: CAA, J. H. Hilton, Chief, Planning Div., Office of Air Traffic Control—CAB, R. G. Carnahan, Chief, Gen'l Rules Div.—AMB, Lt. Col. Carl Fischer, Acting Dir., Technical Div.—USAF, Col. J. W. Ruebel, Chief, Air Traffic Control Branch—U.S. Weather Bureau, N. A. Lieurance, Chief, Aviation Weather Services.

NBAA Exhibitors

(Continued from page 60)

Exhibit booths were requested early, leaving some companies without exhibit space available. These firms will have their hotel location listed on Skyways' bulletin board.

Canadair Ltd.
Reginald Avey, B. G. Smith, Eric McConachie, Haynes Davies

Conover-Mast Publications

Flying Magazine

General Electric Co.

Portland Cement Association

Stern, Walters & Simmons

Switzer Brothers, Inc.

Zep Aero

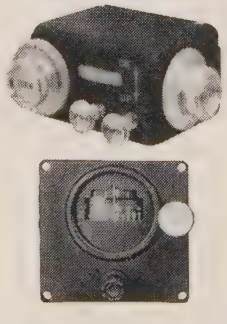
BEECH TRAVEL AIR
with TACTAIR AUTOPILOT
Now CAA Approved

With a Tactair T-3 automatic pilot installed in your Beech Travel Air, you enjoy a new high in travel ease and comfort. Except for take-off and landing, you hardly handle the controls. You arrive relaxed, without fatigue. IFR, your Tactair is the best co-pilot you ever had. It is approved for operation on single engine.

Superior features have made Tactair the Number One autopilot on the market today. The Tactair's pneumatic design operates with uncanny smoothness, puts no extra load on your electrical system. Heading Lock and exclusive Course Selector make instrument approaches, radar vectors and holding patterns "duck soup."

In a fine aircraft like the Beech Travel Air, a lightweight automatic flight system is as important as adequate radio equipment. Once you fly extended cross-country with the Tactair, you'll agree. The Tactair T-3 is available as optional factory-installed equipment or can easily be installed by your Tactair distributor. See him today or write for brochure on the Tactair T-3.

A FAR SUPERIOR AUTOPILOT SYSTEM



The Tactair T-3 operates pneumatically with no warm-up, no power drain, no tubes—so mechanically simple, yet so "human," that it makes any other flight system obsolete. Weighs only 7.3 pounds, simple to install, virtually maintenance-free.

WITH TRUE-READING HEADING LOCK
Tactair's heading lock works on the DG with no confusing zero heading. Merely set the upper card to course desired and you fly that course precisely. No complicated resetting for new course necessary.

NEW! Send for your Free copy of "How to Get the Most Out of Automatic Flight" – a 16-page pilot's operating manual.

ALSO CAA APPROVED for Beech Bonanza, Cessna 175, 182, Skylane, Piper Apache.

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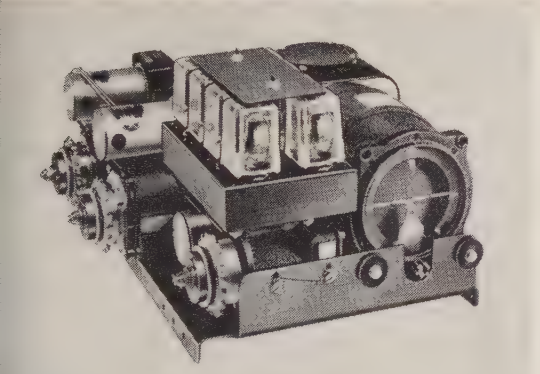
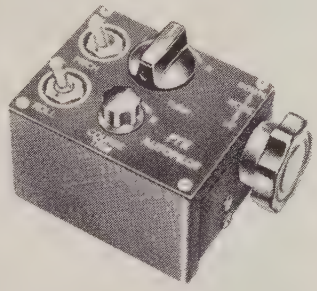
after all is said and done...

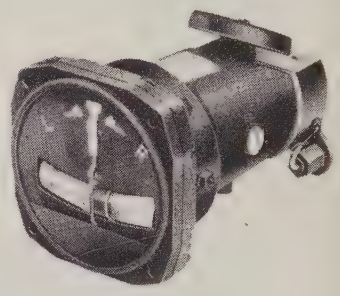
Most Autopilots, including Federal, whether pneumatic, electronic or electro-mechanical, will hold the airplane on a gyro heading maintain proper flight attitude in climbs or descents ...perform precision turns and allow for manual override by the pilot as necessary...BUT, the *Federal* three-axis Tubeless Autopilot is the only low cost Autopilot with these **5** important airline-type safety features...



GYRO SERVO UNIT



CONTROL UNIT



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1. INDEPENDENT INSTRUMENTATION – not reliant on panel instruments for Autopilot operation. Highest IFR flight safety and Autopilot reliability—when it counts!

2. HI-POWER ELECTRIC SERVOS—have positive action, give instant response regardless of air speed, altitude or turbulence. Unrestricted for use in rough air!

3. AUTOMATIC HEADING SELECTION—no gyro headings to set—just turn plane to desired heading. Roll out of turn—Federal takes over—holds new heading automatically.

4. UNITIZED CONSTRUCTION—for lowest maintenance cost. Only Autopilot easily removed as a unit and bench-checked with common tools. Service is fast, economical!

5. AUTOMATIC ROLL SAFETY TRIM—eliminates possibility of abrupt changes of attitude when Autopilot is engaged. Prevents the unexpected—no need to re-trim!

Federal is fully CAA certificated for practically every popular single and light twin-engined airplane – a product of IT&T, one of the world's largest electronic manufacturers – backed by a "world of research"! Federal is lowest priced 3-axis, CAA Certificated Autopilot – $1,995.00 for single engine airplanes – $2,395.00 for twin-engined airplanes, plus installation kit.

For your free illustrated copy of "Freehand Flight" brochure, write: Industrial Products Division, International Telephone and Telegraph Corporation, 15191 Bledsoe Street, San Fernando, Calif.

Federal

TUBELESS AUTOPILOT

Industrial Products Division IT&T INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

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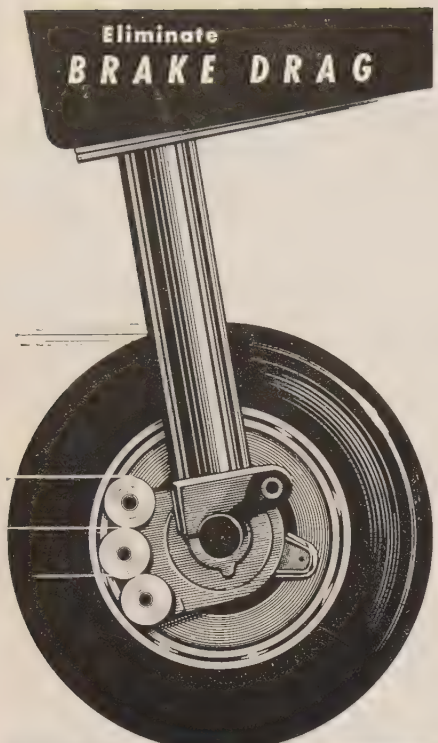

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IN THE BUSINESS HANGAR

■ **POTTER AIRCRAFT SERVICE, INC.,** Lockheed Air Terminal Burbank, Calif., completed double engine change and propeller overhaul of U.S. Forest Service's Beech E-18S based at Salt Lake City. Pilot is J. Karl Bryning.

Consolidated Western Steel Corp.'s Lockheed 18 returned to service after an engine change. Chief pilot, Bill Close; co-pilot, Herb Thomas.

Wilshire Oil Co. of California's Lockheed 18 had 100-hr inspection. Chief pilot, Clint Seccombe; co-pilot, Ed Bunoski.

Petroleos Mexicanos' Mexico City based DC-3 was in for 9-G passenger seat installation, card table, interior refurbishment and Day-Glo paint markings. Chief pilot is Jose Vertiz.

■ **READING AVIATION SERVICE, INC.,** Municipal Airport, Reading, Pa., completed 4,000-hr inspection, new cabin interior, exterior paint, installation of 200 amp generators and Bendix RDR1B Radar System on Koppers Co. DC-3. Captain is B. Q. Van Cott.

American Cyanamid Co.'s Lear Star was in for annual inspection. Chief pilot is William E. Shaughnessy.

Armstrong Cork's DC-3, piloted by Lew Hammer, had double engine change, new de-icer boots and short stack installation.

Birdsboro Steel's Beech D-18 was in for RCA AVQ-50 radar installation, exterior paint, landing gear and flap control system modification.

Davison Chemical's Aero Commander 680 had RCA AVQ-50 radar installed. Pilot is Jack Welsh.

Sun Oil Co.'s DC-3, piloted by Vern Finke, completed 100-hr inspection and had Barber Colman controls installed.

Federated Department Stores' DC-3 was in for 100-hr inspection. Otto Pabanz, is chief pilot.

St. Louis Insurance Group's Aero Commander 680, flown by Walt Westerfield, had AVQ-50 radar installed.

Gulf Oil's DC-3 was in for installation of 200 amp generators.

■ **TRADEWIND AIRPORT,** Amarillo, Tex., installed ARC Radio Package on Skysales Cessna 310B piloted by Joe Cobb.

Wilson Oak Flooring's Beech E-50 had ARC FES-12-10 radio installed, Lear Auto Pilot with approach coupler, etc.

Al Greer flew his Beech B-50 in for 1,000-hr inspection.

Panhandle Steel Building's Beech F-35 received major overhaul and new license including paint job and additional equipment.

Tom Moran flew his D-50 Twin Bonanza in for 500-hr inspection.

Plains Machinery Co.'s Beech 18, piloted by John Scamahorn, was in for radio installation.

John Lott's U Lazy S Ranch Beech was in for dual omni and automatic pilot installation.

■ **PLANESERVICE, INC.,** Division of The Norman Larson Co., Van Nuys Airport, Calif., just completed testing an overhauling of radios in the Whitema Manufacturing Co. Bonanza.

Morrison-Knudsen Co., Inc., took de livery of their first Beech Travel Air wit the installation of secondary communica tions, ADF, 3 Lite Marker, Glide Slope an Propeller Unfeathering Accumulators.

Brig. Gen. Marcus F. Cooper, of th AF Flight Test Center at Edwards AF flew his personally owned Bonanza in fo repair and calibration of the omni receiver

Pacific Automation Products flev their Twin-Bonanza in for overhaul of thei #1 Omni Receiver.

Eight Ball Flying Club of Van Nuy brought in their Cessna 172 for repair an calibration of their VHF and Low Fre quency Radios.

Fred Hintz of Bakersfield brought i his Model H-35 Bonanza for adjustmen and calibration of his Autopilot.

Mayor Dan Searle of Monterey stopped in with his Bonanza for the repai and calibration of his VHF radio.

■ **AERO TRADES, INC.,** Ronkonkoma N. Y., completed periodic inspection an other work on Joseph James Ryan's Nort American B-25. Chief pilot is Charles W Bing.

Joyce Lumber Co.'s Grumman Ma lard, had tank re-sealing. Chief pilot i Mr. Daniels.

Schenley Corp.'s DC-3 had landin gear overhaul and miscellaneous repairs t damaged tail areas. Chief pilot is Gu Rahm.

The Ontario Paper Co., Ltd.'s Gru man Mallard had repairs to hull secti and miscellaneous additional work. Ch pilot is Mr. Holden.

Olin Mathieson Chemical Corp DC-3 had engine change. Chief pilot Wm. Heaton.

The Gillette Co.'s Lockheed Learst had replacement of left and right landi gears. Chief pilot is H. E. Wood.

C. F. Kettering's Grumman Malla had 100-hr inspection and additional wor Chief pilot is Dick Gately.

Vincent Astor's Grumman Malla had re-sealing of hull and additional r dio installation. Chief pilot is Haro Swift.

Spencer Kellogg's Navion had interi upholstered and miscellaneous work.

Republic Oil Refining Co.'s Gru man Mallard had periodic inspecti change of left and right engines and nec sary airframe work. Chief pilot is B Jacox.

Fairchild Engine Division's Bee craft E18S had 100-hr inspection. Ch pilot is R. L. Rodgers.

■ **REMMERT-WERNER, INC.,** Lamb Field, St. Louis, Mo., installed a Coll 51X VHF receiver in the Schenley Ind tries Super-92 DC3. Gus Rahm is the pil

Offshore Company DC3 came to Louis for an engine change, installation a five point magneto harness, and 100-hr spection in the Wrap Around Shop. Snow is the pilot.

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Ross Manufacturing Company brought its D18S for installation of Collins 17L7-51X2 VHF with omni, Collins 17L8-51X3 standby Sperry H5 electro gyro horizon, Collins 51V3 glideslope, A.R.C. Type 21 lightweight ADF, custom panels, modernized front bulkhead and removal of rear bulkhead, new interior fabrics and reupholstering, stripping and repainting of exterior, double engine change, prop overhaul, wing removal, 1,000-hr inspection, and other work.

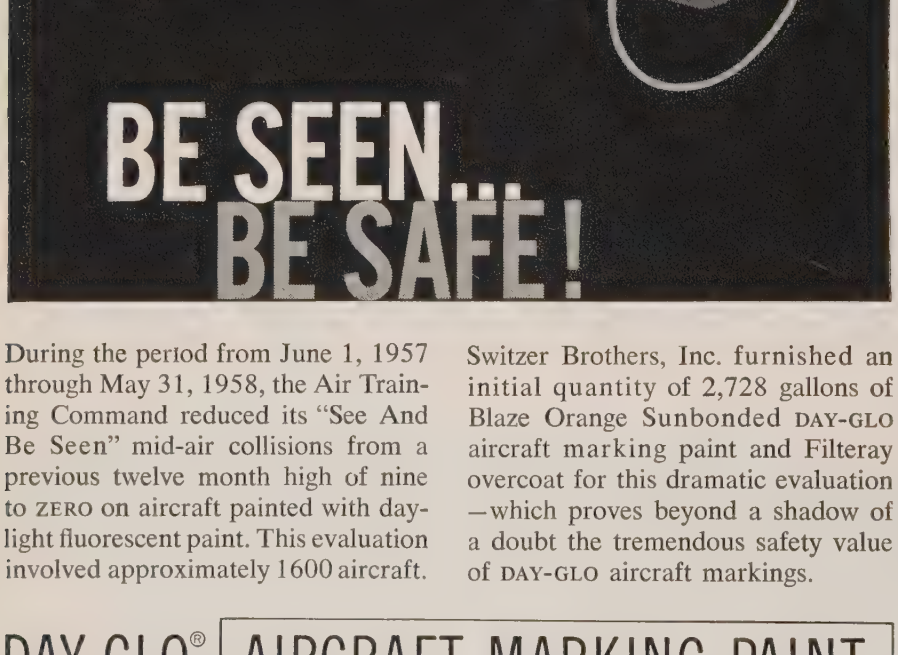
TV Associates brought two of their twin Beechcraft for double engine changes, 100-hr inspection, installation of Hartzell three bladed props, installation of radio, and other work.

H. D. Tousley Construction Co. Aero Commander was in for a 100-hr inspection and engine change.

Kewanee Oil Company's PBY was in for licensing, rudder modifications, installation of an executive interior and galley, and other conversion work. Skip Wittner and Bob Quelch are the pilots.

Mississippi River Fuel Lodestar had a fresh Super-92 engine installed in St. Louis. Ralph Primo and Ray Waldt are the pilots.

■ **THE GARRETT CORP.'s AIRESEARCH AVIATION SERVICE DIV.,** Los Angeles International Airport, Calif., has received the first of four Government



During the period from June 1, 1957 through May 31, 1958, the Air Training Command reduced its "See And Be Seen" mid-air collisions from a previous twelve month high of nine to ZERO on aircraft painted with daylight fluorescent paint. This evaluation involved approximately 1600 aircraft.

Switzer Brothers, Inc. furnished an initial quantity of 2,728 gallons of Blaze Orange Sunbonded DAY-GLO aircraft marking paint and Filteray overcoat for this dramatic evaluation —which proves beyond a shadow of a doubt the tremendous safety value of DAY-GLO aircraft markings.

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The Don L. Myers Company, *Palo Alto, Calif.*

Piedmont Aviation, Inc., *Winston-Salem, N. C.*

Sky-Store, Inc., *Hawthorne, Calif.*

Skyways, Inc., *Troutdale, Oregon*

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of Thailand DC3s for major overhaul, engine change and interior modification. Two are to be given troop carrier configuration and the others a 28-passenger configuration. The operation is being carried out through the California Export Co.

Pittsburgh Plate Glass, DC-3, flown in by Pilots Buck Newton and Bob Middle by for 4,000-hour overhall, refurbishing of the interior and installation of the AiResearch Maximizer on —94 engines. The Maximizer is approved for 26,900 lbs gross weight.

Reynolds Metal, two DC3s, received radio and miscellaneous service work. Pilots were Charley Johnson and Bill Hotze.

La Brea Securities, Lodestar, with Pilots Tom Penfield and Joe Potter at the controls, in for 100-hr inspection of the aircraft and engines, and Day-Glo exterior paint for greater safety in flight.

Ladish Co., DC-3, receiving double engine change, wing removal, 100-hr inspection, annual relicensing and interior work. Pilot is Larry Harder.

Morrison-Knudsen, D-18S, was in for application of Day-Glo paint scheme to exterior.

CAA, Convair 440, brought in by Ed Hanlin for modification of AiResearch gas turbine power supply unit.

U. S. Industries, Convair 440, was in for miscellaneous service work. Piloted by John Pike and Angelo Pappas.

Overseas shipments of AiResearch Maximizer kits for installation on DC-3's were recently made to Africair, Ltd., Johannesburg, S. Africa; Avensa, Caracas, Venezuela; and Eagle Aircraft Services Ltd., London, England.

■ **NORTHWESTERN AERONAUTICAL CO.,** Holman Field, St. Paul, Minn., installed Aitkins Anti-collision lights on Minn. Mining and Mfg. Co.'s three DC-3's and Lodestar.

Minneapolis-Honneywell's two DC-3's had fuel and oil tanks overhauled.

General Mills DC-3's had Aitkins Anti-collision lights and Day-Glo paint applied.

Olin Mathieson Chemical Corp.'s Aero Commander had Day-Glo paint applied. Pilot is Bill Heaton.

Pfeiffer Brewing's Lodestar was in for 100-hr check and engine change. Bill Hafner is pilot.

Eastman Kodak Co.'s DC-3 was in for quick-change of control surfaces. Chief pilot is J. W. Clemow.

Minneapolis Star and Tribune's DC-3 was in for 100-hr inspection and overhaul of landing gear and brake assemblies. Bud Mitchell and Wayne Hinderacker are pilots.

■ **AMERICAN AIRMOTIVE CORP.** International Airport, Miami, Fla., recently completed a 100-hr periodic inspection and engine change on Hoover Co.'s Douglas DC-3. Pilots Bill Watt and Dave Adam supervised the work.

Northeast Airlines has occupied the first 240 feet of the huge 900' x 165' four cantilever hangar of American Airmotive.

The Haitian Air Force has a Douglas DC-3 at American Airmotive hangar for complete overhaul, new interior and paint job. Senior Lt. Raymond Dulix and Lt. Jan Colbert and Sgt. Pierre Fritzberg have been assigned by the Haitian Governme

BENDIX RADAR SAVES WEIGHT, SPACE ON FAIRCHILD F-27

re's important weight and space-saving
vs for airlines and multi-engine busi-
s aircraft owners. Now available from
dix* . . . a new 150-mile range air-
ne weather radar TRANSMITTER/
CEIVER weighing only 28.7 pounds
completely housed in a 1/2-ATR
kage.

his new T/R unit, when used with the new Bendix 18-inch stabilized antenna, reduces the total system equipment weight to 82 pounds. (With 22- and 30-inch antennas, total system weight is approximately 91 pounds.)

Because of its lighter weight, smaller size, reduced power requirement, and increased performance, Bendix Weather Radar is recommended by FAIRCHILD for installation in the F-27.

For further information, write Bendix Radio Division, Aviation Electronic Products, Baltimore 4, Md. Export: Bendix International Div., 205 E. 42nd Street, New York 17, N. Y. Canada: Computing Devices of Canada, Ltd., Box 508, Ottawa 4, Ontario.

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Bendix Radio Division

Bendix AVIATION CORPORATION

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GUARD AGAINST THE DANGER OF MID-AIR COLLISION!

It is a fair estimate that there are between 10 and 15 "near misses" everyday over the continental U.S. —*Mid-air Collision Symposium*

BOLD® "Safety-Sight" Fluorescent Colors protect you against the two main causes of mid-air collision and "near-misses"!

1. LACK OF COLOR CONTRAST IN REGULAR PAINT

BOLD® "Safety-Sight" colors are extremely *high contrast* colors. On cloudy days, at dawn, at dusk, these amazingly brilliant colors make your plane stand out sharply, even at distances of over 10 miles for smaller aircraft.

2. HIGH ALTITUDE MYOPIA

BOLD® "Safety-Sight" Fluorescent Colors can actually be "sensed" before they are seen, especially at higher altitudes when pilot vision is subject to nearsightedness. **BOLD®** "Safety-Sight" Fluorescent Colors are easy to see even with peripheral vision!

BOLD® "Safety-Sight" Fluorescent Colors have been tested by the USAF and are used at numerous bases both for aircraft markings (especially on training planes) and to outline warm-up, runway, and test areas on the field.

BOLD® "Safety-Sight" Fluorescent Colors are inexpensive to apply and maintain . . . last for months!

Use **BOLD®** "Safety-Sight" Colors to make runway cones, field boundary markers, and tower and hangar installations "pop-out" from surrounding terrain.

Lawter Chemicals, Inc., has pioneered in the formulation of quality fluorescent pigments since the early 1940's and offers immediate coast-to-coast delivery from four conveniently located plants.

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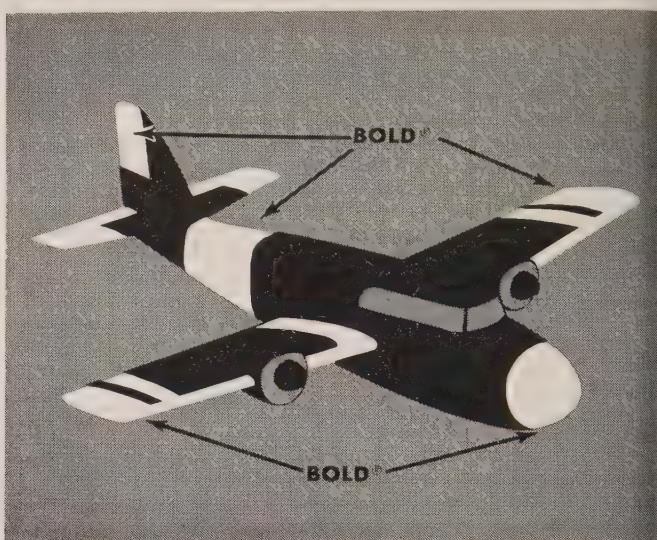
These colors, when applied as directed, will afford high-contra safety protection against mid-air collisions for periods up to months.



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to cooperate with AA's supervisors.

Three Agricultural NA-75 aircraft manufactured by American Airmotive were delivered this month to the Cotton Cooperative of Salvador, Central America. Representatives of that Central American concern, Ulisses Gonzales and Asdrubal Corrales took delivery of the aircraft.

H. J. "Skip" Neely, pilot for Dr. Litchfield, President of the University of Pittsburgh, has taken delivery of his Beech D18S after undergoing 1,000-hr overhaul, double engine change and interior refurbishing.

Casco, Inc., had their Twin Beech in for a double engine change and other work.

Aerovox, Inc., had their Super E-18 in for miscellaneous maintenance. Pilot is Vernon Wright.

Hacienda Hotel of Las Vagas, Nev. took delivery of their luxurious Douglas DC-4 after having custom interior installed. Mr. and Mrs. Henry Price, owners, hosted a "Champagne Inaugural Flight." Crew was Capt. F. O. Smith; Richard Keefer, co-pilot; and Carol Thorsness, stewardess.

■ **BAYAIRE AVIONICS, INC.,** International Airport, Oakland, Calif. completed installation of new instrument panel for Aero Commander owned by Blackfield Aero Industries. Pilot is Bob Dolan.

Le Mount Corp.'s Cessna 310 had ARC Type FES-1210-1 System Flite-Tronics MB-3 Marker Receiver, R-89 Glide Slope installation. Pilot is Lee Stevens.

Boquillas Co.'s DC-3 had complete 100-hr radio inspection on all equipment and antennas. Pilot is Jim Gray.

Standard Oil Co. of California's V count recently had overhaul of VHF Tra mitter and other radio gear. Chief Pilot Art Walker.

Utah Construction Co.'s Learstar h two ARC 21A ADF's installed. Pilot Doug Garneau.

Pacific Airways Corp. of Manila, P had Sun-Air Transmitter and electric antenna installed in their Navion. Pilot Al Onstott.

Pacific Bridge Co.'s Cessna 310 had stallation of R-89B Glide Slope Receiv Collins 37-P Glide Slope antenna, Fli Tronics MB-3 Marker Receiver, DA M-1 Marker Antenna, Flite-Tronics C Speaker amplifier, L-2 autopilot with proach coupler and altitude control, ed lighted glareshield control panel and post lighted instrument panel, Wright ecutive "90" transceiver and edgeligh cowl radio control panel. Pilot is El Stone.

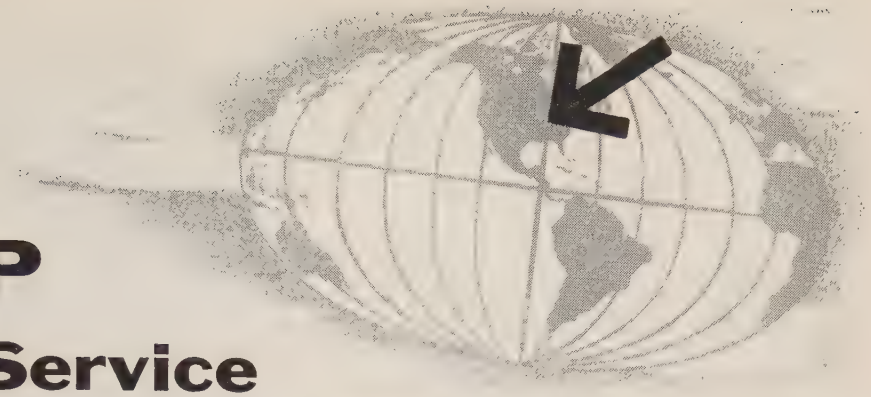
Riviera Food's Bonanza had recent stallation of Lear ADF-12E. Pilot is Giordanino.

Capital Lease Corp.'s Apache Wright Executive "90" installed. Pilot Rip Noble.

Bechtel Corp.'s two Lodestars each AP-101 Autopilot and Bendix RDR Radar installations together with rewi of all radio equipment. Their third L star is now in the process of having same installation. Chief Pilot is A. Rodan.

L. J. Holland of Reno had ARC- CA-2A, R-89B, Narco 1016, Lear ADF-1

(Continued on page 80)



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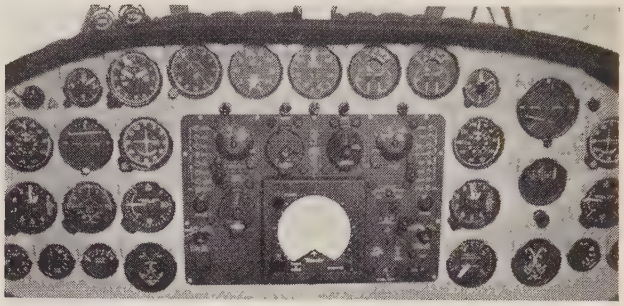
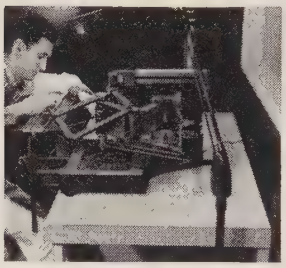
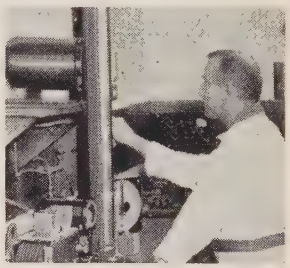


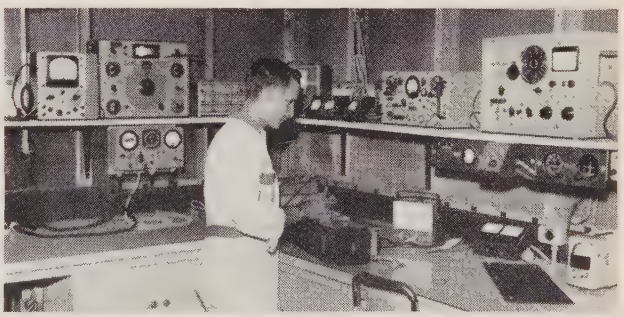
Efficient planning results in grouping and centralization of scattered controls on one master radio control panel.



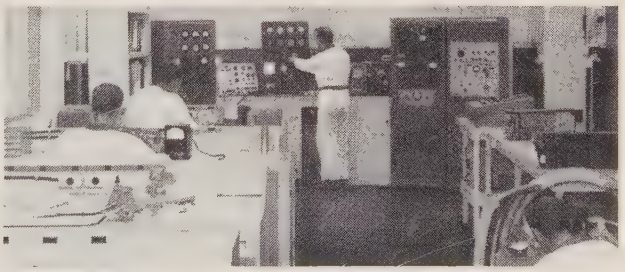
Custom Engraving



Accurate instrument calibration



In this modern screen room, accurate calibration of radio systems is made possible by eliminating outside interference.



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GREENHOUSE PATTER

By "Torch" Lewis

There are some ancient but recurring petty grievances in this wretched business which merit illumination, so iffen you'll stand clear of the right prop, I'll give 'em a blast.

Number one on the list is the weather teletype. In VFR weather the teletype is five-square, a thing of beauty, a mechanical marvel. As the ceiling lowers, however, so does the efficiency of the teletype reproduction and as the weather really gets foul, the sequences look like my first day in Typing 1A.

Particularly exasperating is the frustrating way the machines have of garbling one's destination (IFR) or omitting it altogether. The other day at DCA the awesome forces of the ATC and CAA weather service ganged up on us. ELM was skittering between limits and below limits and for three straight hours was missing altogether. The sneak in the weather office, with obvious disregard of Standard Bureaucratic Operational Procedures, called Capital Airlines and got us the weather. We filed IFR, noting preferential routing if you will, and even worked out the navigation to the third decimal place. Taxied out, "Ready to copy?" sez tower. "Proceed," we say, and they proceeds to give us a stacatto clearance eggzactly opposite from that which we wuz listenin for, including some check points which they dreamed up in transit. We finally get unscrambled and ready to go. They clears us into the murk and upon reaching cruise altitude we starts futzin with the muckets when—hold the phone for an altitude change plus do a one-eighty and go to Baltimore. Well suh, between takeoff and Baltimore we get four altitude changes plus our clearance gets scrambled or amended three times. It's hard to tell who is busier, the guy flying or the guy writing.

My last bleat concerns the Weather Bureau telephones. In most major cities, if the weather even starts to look bad, you can't get a line into the Bureau. This goes for the unlisted numbers as well as the listed.

The other day at DCA I noted a fine looking DC-3 at the end of Runway 15 girding its loins to do battle with the gathering cumulo nimbii. We watched it in detached fashion. As he broke ground, we noted that his co-pilot was a real slow gear man, in fact pretty soon they was nearly plumb outta sight with the gear still silhouetted against the sky, and what do you know, purty soon here they come on the downwind and in for a landing. They taxies in, a brawny mechanic from Butler Aviation goes out and pulls the pins outta the down-locks, hands them to a very red faced gentleman from up in the Greenhouse and off they go.

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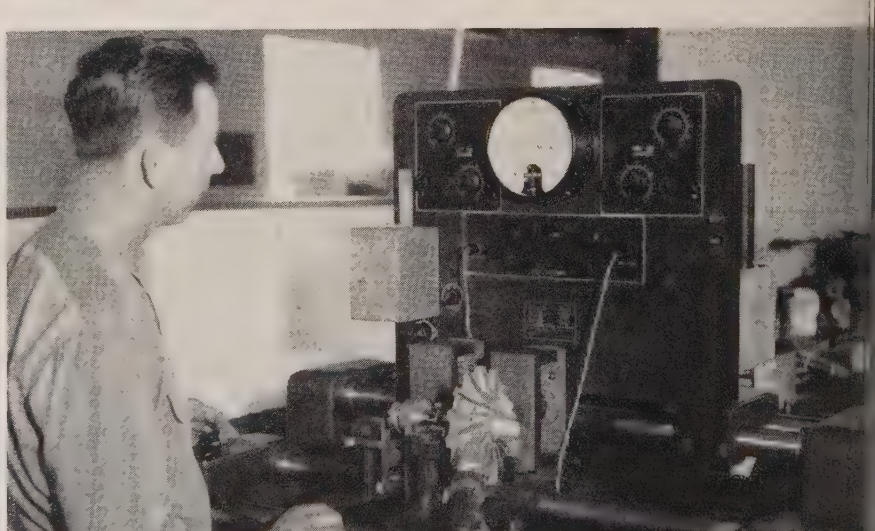

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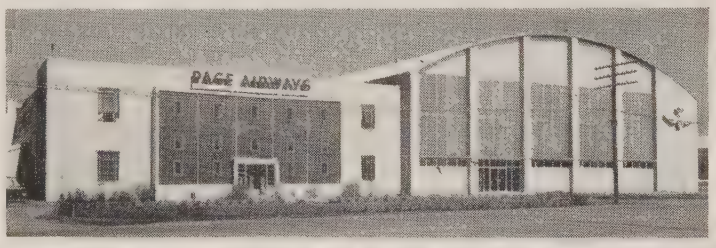

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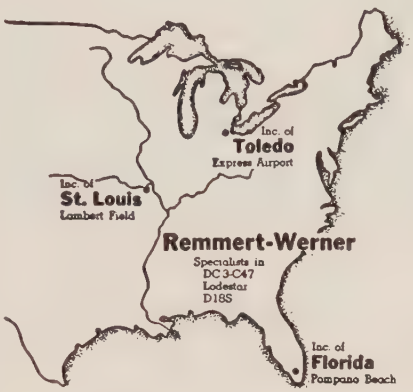

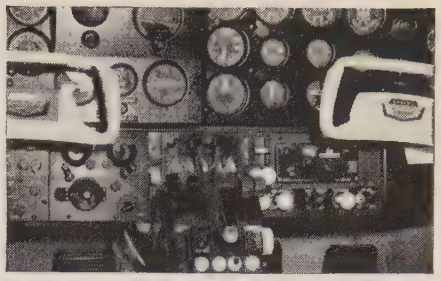

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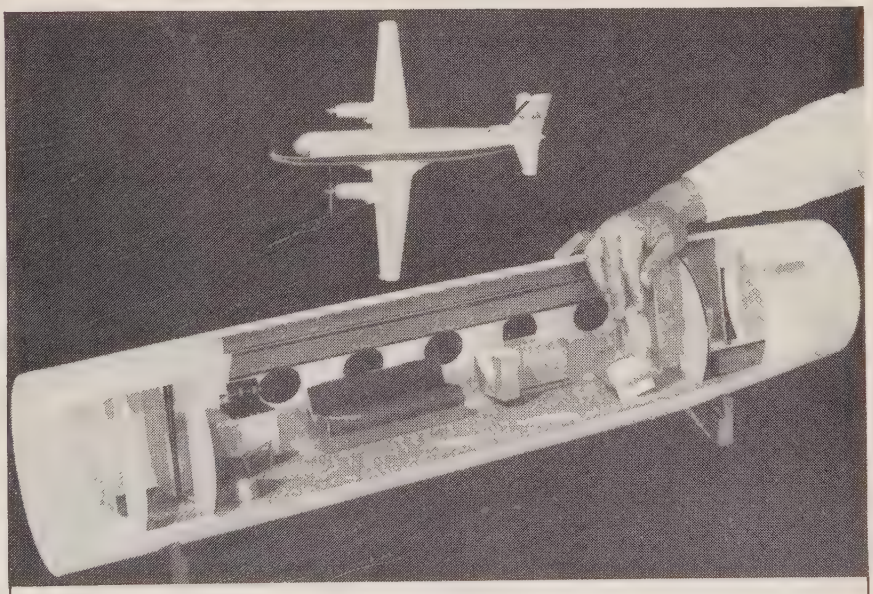

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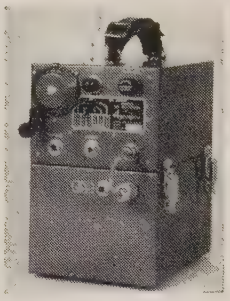

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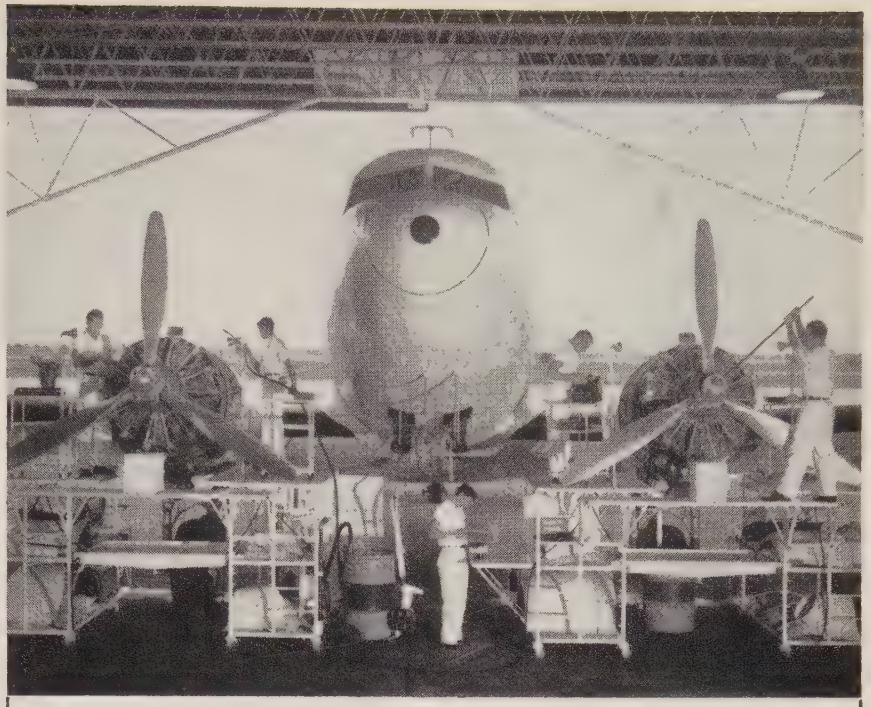

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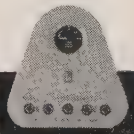

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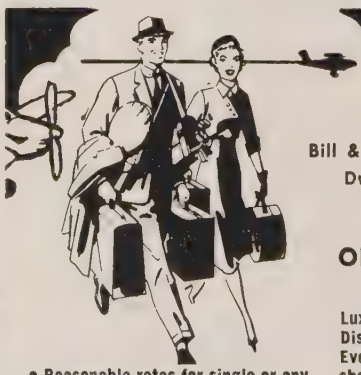

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The Lonely Sky

(Continued from page 38)

of our limitations, limitations built into the human mind and into the nervous system of man and, therefore, imposed of necessity on the crowded sky of 1958.

In establishing these limits for ourselves we have *not*, as some backward looking old leather hats might have complained, lost the freedom for which pioneering pilots fought. We have simply reassessed progress so that progress wouldn't end. In common law there is a general principle that no individual shall have the freedom to engage in any act harmful to himself or to anyone else, whether the act is willful or otherwise. And we are not here discussing that fringe minority of willful acts of negligence or carelessness. Rather we are talking about the sly little things we do unconsciously—the forgetting of onorous detail, the ignoring of evidence that may negate our previous work, the putting off of something we *ought* to do in order to do the thing we *want*. What we are doing in the air today and what we are going to have to continue to do from now on in, is to legislate against not man himself, but against this errant little animal in every man. We are in the process of educating pilots to live, and not to die, this second self.

This is the basis of today's philosophy of flying safety, the cornerstone on which we have to build any program for the prevention of aircraft accidents. We have had to go into the business of creating an attitude, caution, and of producing its intangible but vital product, discipline, without destroying the initiative that makes the pilot all the other things he has to be. Because when all is said and done, the lessons of Las Vegas, Pacoima, California, and Grand Canyon, are obvious, and one simple fact remains apparent in the crowded air today. The plane designed, constructed, repaired, maintained and flown by men who have not been alerted against themselves, has no business flying anywhere!

NBAA Director Notes

(Continued from page 10)

Tid-bit of the month: U.S. government is busy girding its loins to sell VORTAC navigational system to ICAO nations. U.S. Army one of the participants in the U.S. selling program. Decca-Dectra (British nav system being pushed by some ICAO nations) brochure out in the mail, (published by D-D, natch) graphically describes how U.S. Army busy using Decca-Dectra in helicopter operations overseas . . . and indicating that U.S. Army is happy as larks with D-D! Meanwhile, Procurement Division of CAA is soliciting industry for available DME equipments and spare parts to facilitate Airways Flight Inspection work!

Bill Lawton

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Cap'n Sharp Says:

"Fine Fillies in Philly!"

The "old pro" highly recommends Philadelphia—the City of Brotherly Love—for the 11th Annual NBAA meeting, September 22-24. He knows his way around—like the pilots who prefer Jeppesen & Co. Avigation Products and Services.

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Who will be Miss Business Aviation in 1958?

Finalists for the Title

CECILE HAYDEN, *customer service representative, Spartan Aircraft Co. Sings "cool" jazz, writes short stories and poetry.*

MARY OTT, *blue eyes and 19, is secretary to the president of Dare, Inc. She sings professionally and is a student pilot.*

KATHERINE H. STEPPLER, *25, asst. secretary, Atlantic Aviation Corp. Brown hair, hazel eyes, she's a private pilot.*

Business Hangar

(Continued from page 70)

and Lear 3-lite Marker installed in his Cessna 310.

Business Aircraft Distributor's Cessna 310 demonstrator had complete electrical wiring antenna leads and radio panels for L-2 autopilot, approach coupler and altitude control, ARC-15E, R-89B Glide Slope, CA-2 Audio Amplifier, Mark II Omnigator, ADF-12E2 and LVTR-36 channel.

■ **AERO ELECTRONICS, INC.,** Sky Harbor, Phoenix, Ariz., had Super 18 of Empacadora De Conserva of Los Mochis, Mexico, in for installation of ARC Type 21 ADF, Scott Oxygen System, Aircraft Equipment Mfg. Co. Cabin Refrigeration Air Condition system, Lear L2 Autopilot w/altitude controller, Sun Air Transceiver and Cabin Radio.

Utah Construction Co. of Mexico had their 310 in for installation of Sun Air Transceiver and ARC ADF-21.

Neil B. McGinnis Equipment Co. had their Bonanza in for installation of Collins 17L8 and 51X3 Communication system.

Vegetable Oil Produce Co., Inc., had their Twin Bonanza in for the installation of Bendix MKA7A 3 lite Marker Receiver and Wright 90 channel Communication system.

■ **PIEDMONT AVIATION, INC.,** Winston-Salem, N. C., performed 100-hr inspection on E18S, owned by Smith Transfer and flown by Grady Adams.

Detroit Steel Corp. had their DC-3 in for 100-hr inspection and paint job. Chief Pilot is Bill Ashton.

Vansant Coal Co.'s pilot, Gurner Smith, flew their PA-23 in for 100-hr inspection, radio installation and misc. repairs.

Procter and Gamble Distributing Co. had their DC-3 in for 100-hr inspection, new interior, paint job, radio work and misc. repairs.

■ **PACAERO ENGINEERING CORP.,** Santa Monica, Calif., delivered the second Learstar Mark II to Westinghouse Electric Corp. A. C. Korb is chief pilot.

British American Oil Co., Ltd., took delivery of their second Learstar, a Mark IA. R. J. McVicar is chief pilot.

Johnson & Johnson's chief pilot, Bob Darnall, brought in their DC-3 for interior work.

Bechtel Corp.'s Lodestar was flown in for installation of Learstar rudder spring tab system. This is the third Bechtel Lodestar which has had this system installed.

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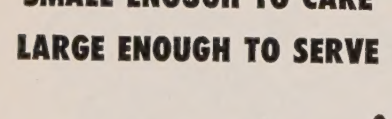

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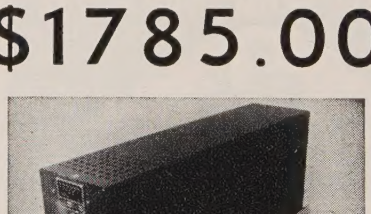

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